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Volume 6

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CHEMICAL ABSTRACTS

Vol. 6. JANUARY 10, 1912. No. 1

1. APPARATUS

L. C. JONES.

Apparatus for Nitrogen Determination According to Kjeldahl. KRIEGER. *Chem. Ztg.*, 35, 1063.—A 500 cc. flask with 2 holes in the stopper, one carrying the trap and the other a tube extending to the bottom of the flask for introducing steam and the alkaline soln., the latter running from a separatory funnel fused to the upper side of the tube. J. H. MOORE.

New Apparatus for Determining Sulfur and Carbon in Iron and Steel. D. A. WENNMANN. *Z. angew. Chem.*, 39, 1861–2; *Chem. Ztg.*, 35, 863.—Cuts and descriptions of 2 flasks and coolers, one for S the other for C. J. H. MOORE.

A New Measuring Cylinder. H. HOLTKAMP. *Chem. Ztg.*, 35, 1131.—A 100 cc. graduate in which the lower or upper part, or both, is narrowed so that the readings may be made to 0.2 cc. For use in fractionations. J. H. MOORE.

Gas-evolution Apparatus. G. PREUSS. *Chem. Ztg.*, 35, 1131.—A modified Kipp app. in which the usual delivery tubulure is replaced by a larger one in which fits a hollow stopper containing H_2O for washing the gas, the flow being regulated by turning a hole in the side of the stopper to connect with a groove inside the tubulure. J. H. MOORE.

Carbon Monoxide Detector. R. NOWICKI. *Chem. Ztg.*, 35, 1120.—A small glass app. which may be carried in the pocket, the presence of CO being indicated by the blackening of a strip of paper moistened with $PdCl_2$ soln. The vol. % CO and time in min. for the reaction to begin and till complete blackening are resp.: 0.010, 11, 60; 0.025, 5, 32; 0.050, 3, 16; 0.075, 2, 12; 0.100, 1, 9; 0.250, $^{11}/_{15}$, 6; 0.500, $^{18}/_{30}$, 4; 1.000, $^{4}/_{15}$, 2. J. H. MOORE.

Flask for Quantitative Fermentation Experiments. H. FRANZEN. *Chem. Ztg.*, 35, 987.—An Erlenmeyer flask with long neck. A metal collar around the neck has 4 arms which support an inverted glass cap which prevents infection and allows uniform access of air. J. H. MOORE.

Leveler. E. NOGA. *Chem. Ztg.*, 35, 997.—An automatic app. for holding constant level in a filter funnel or evapg. dish. It consists of a glass tube 25–30 cm. long and 25 mm. diam. with a 2-hole stopper in the upper end. Through one hole passes a tube about 6 mm. in diam., the lower end flush with the lower end of the larger tube and the upper end connected by rubber tubing with a tube extending to the bottom of the stock bottle, forming a siphon. The second hole connects with a second hole in the stock bottle stopper, admitting air when the liquid level falls below the end of the larger tube. J. H. MOORE.

A New Distillation Flask. A. DAHLE. Univ. Jena. *Chem. Ztg.*, 35, 1027.—To prevent distillations under vacuum from spitting over, an adjustable tube with flared end is passed through the cork, the thermometer being in a side tube. J. H. MOORE.

Clean and Convenient Opening of Preparation Flasks. H. KOHL. *Chem. Ztg.*, 35, 1027. J. H. M.

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New Heaters. O. GRÄBNER. *Chem. Ztg.*, 35, 1041.—Cuts and descriptions of various patented cast iron app. for heating or cooling liquids and gases. J. H. M.

Method of Filling Reagent Bottles. J. H. WALTON, JR. *J. Am. Chem. Soc.*, 33, 1585–6.—From an air pressure pipe are suspended several specially constructed valves. By inserting these valves and proper siphon connections into the neck of stock carboys reagent bottles are filled. Drawings and details of valve are given. C. A. COLE.

Rapid Filtering Funnel. H. SPURRIER. *J. Am. Chem. Soc.*, 33, 1584–5.—By deeply etching lines from a point below the apex of the funnel to points forming a ring about $^2/_3$ of the way up the sides, the grooves not being deep enough to break filter on washing, filtration is increased about $2^1/_2$ times over normal rate. C. A. COLE.

Prevention of Bumping. H. SPURRIER. *J. Am. Chem. Soc.*, 33, 1632–3.—To avoid explosive ebullition coincident with the boiling out of alc. from. an aq. soln. a piece of glass tubing open at both ends is introduced into the liquid. One end is open to the air. C. A. COLE.

Automatic Filter. M. L. HAMLIN. *J. Am. Chem. Soc.*, 33, 1584.—A large separatory funnel is mounted on a ring stand over a filter funnel containing a folded filter in such a manner that the stem of the separatory funnel is slightly above the vertex of the paper. A rubber tubing connects the lower funnel with the separatory funnel through a 1-hole stopper. The app. is started by opening the stopcock and the height of liquid in filter funnel controlled by the position of tubing in lower funnel. C. A. COLE.

Preliminary Report of the Committee on Quality of Platinum Laboratory Utensils. WM. F. HILLEBRAND, PERCY H. WALKER AND E. T. ALLEN. *J. Ind. Eng. Chem.*, 3, 686–91.—Fe and Ca appear to be the chief impurities. It causes loss on strong ignition, but imparts stiffness which is essential in large vessels. It is probable that the acknowledged inferiority of present-day ware is due to scrap Pt having been worked over for chem. ware. A final report with specifications will follow. E. J. ERICSON.

Improved Extraction Apparatus Obviating the Formation of Emulsions. E. POZZI-ESCOT. *Ann. chim. anal.*, 16, 382–3.—A description of a separatory funnel designed to hasten extractions by preventing emulsifying on agitation. The stopper is pierced by a small hole which coincides with the opening in a short tube sealed in the neck of the funnel. Solute and solvent are placed in the funnel and suction applied. A slight turn of the stopper closes the opening in the tube and maintains the vacuum. When the contents have been sufficiently agitated, the stopper is again turned and the sudden inrush of air dispels any light emulsion that might have formed. P. especially recommends the use of the funnel in the extraction of oxidizable liquids and in the analysis of cocaine. It is made by the Poulenc frères. J. S. GOLDBAUM.

Hydrogen Sulfide Tap. J. H. WALTON, JR. *J. Am. Chem. Soc.*, 33, 1586–7.—The tap is essentially a strong spring pinch clamp fastened to a board. By pushing a lever attached to the clamp it is opened, allowing H_2S to flow. The flow of H_2S is regulated by a screw pinch clamp placed before the strong spring clamp. Drawings are given. C. A. COLE.

A Convenient Camera for Color Comparisons in Nessler Tubes. EDWARD BARTOW. Univ. of Ill. State Water Survey, *Bull.* 8, 126–7.—Consists of a partly closed box $41^1/_2 \times 25^1/_2 \times 8^1/_4$ in. The tubes are set on a glass over a shelf having a series of 1 in. holes for the passage of light and are supported by a second shelf 6 in. higher. 4 in. from top and 4 in. from bottom of box are 2 mirrors 40 by $5^1/_2$ in. which rotate on an axis. Light is admitted through the back and below the lower shelf; by adjustment of

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mirrors light is reflected through the tubes and the colors easily compared by observing the upper mirror. The app. has capacity for 27 tubes 10 in. high.

D. K. FRENCH.

Arrangement of a Hood. SPECTATOR. *Chem. Ztg.*, 35, 254–5.—The size given for the best and most perfect hood is: Length, 550 cm., height, 240 cm. in front and 295 cm. in rear, windows 35 × 35 cm. The air should enter from the bottom. Hood windows should move horizontally. Gas should be so arranged that the cocks, of which there should be a number, may be reached from the outside and under the top of the table. The draft is best produced by a specially built chimney.

GEO. B. FRANKFORTER.

New Type of Automatic Inflammable Gas and Vapor Detector. A. PHILIP AND J. L. STEELE. *J. Soc. Chem. Ind.*, 30, 867–72; see *C. A.*, 5, 3183. M. B. SMITH.

The Determination of Moisture in Fuel. J. A. P. CRISFIELD. *J. Frank. Inst.*, 172, 445–502.—A moisture determinator is described, by use of which moisture detns. may be made at the place of consumption. It consists of a fuel chamber provided with a steam jacket and a graduated glass tube, water jacketed, to receive the moisture distilled over from the fuel. Steam is used at 230° F. so as to drive off all H_2O but without the volatilization of hydrocarbon vapors. Advantages claimed are: Only 1 weighing is necessary; sample (1 lb.) is large, hence errors in wt. are relatively small; the moisture in the fuel is condensed to water, hence is visible. The instrument may be used for H_2O in metallic ores and for water and light oils in tar.

M. B. SMITH.

New Improvements in the Petrographic Microscope. FRED E. WRIGHT. Geophys. Lab., Washington. *Centr. Min.*, 1911, 555–9, 581–8. E. T. WHERRY.

The Engler Liquid Meter. R. v. MISES. Strassburg. *Physik. Z.*, 12, 812–4.—This meter measures viscosity by rate of flow out of a vessel. The arbitrary indication of the instrument is, by a theoretical treatment, compared with the true viscosity, but the % accuracy is not given. The method fails for viscosity less than that of H_2O at 20°. W. P. WHITE.

Note on a Variable Flow Resistance. J. H. DELLINGER. Bur. of Stand. *Physic. Rev.*, 34, 215–6.—This consists of a tube of some insulating material, containing Hg, through which the current passes; a Cu wire thrust in, to various depths, short-circuits part of the Hg. A column 15 cm. long by 0.4 mm. gives 1 ohm; 4 mm. diam. 0.01 ohm. A U-tube is convenient, since it avoids sealing in the terminals. This arrangement has nearly constant self-induction. W. P. WHITE.

Two Reading Microscopes. W. VOLKMANN. *Physik. Z.*, 12, 734–5.—A microscope whose uses lie somewhat between those of ordinary microscopes and telescopes.

W. P. WHITE.

New Apparatus of the Cambridge Scientific Instrument Company. F. BOCK. *Physik. Z.*, 12, 729–30.—Among other app. is mentioned a moving coil galvanometer with very light coil and long suspension, whose current sensitiveness for 3-sec. period is 740 Ayrton units (mm. at 1 m. per microamp.). An instrument for continuous registration of the CO_2 content of furnace gases operates by the differential motion of 2 gas meters, one of which measures the gas before, the other after, the CO_2 is absorbed by dry CaO. W. P. WHITE.

Report on the Annual Exhibition of the Société francaise de physique. O. SCHEUER AND JEAN SAPHORES. *Physik. Z.*, 12, 639–46.—Descriptions of the more important new instruments exhibited—mainly for electrical measurements of various kinds.

J. JOHNSTON.

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Pycnometer for Density Determination. L. v. KREYBIG. *Chem. Ztg.*, **35**, 1120.—For fatty and viscous substances, it consists of a flask with ground cock in lower end of neck, a large hole being bored through the body and walls of cock. The app. is filled while the hole in the body of the cock is in a vertical position. By turning through 90° angle the upper part of the neck and the hole through the cock may be cleaned with a volatil solvent. J. H. MOORE.

Ether Apparatus and Stray Electric Currents. I. L. C. ECKELT. *Chem. Ztg.*, **35**, 1131.—E. cites a case where the heating coils in an ether factory were destroyed in 36 hrs. by stray currents due to careless wiring. The trouble was overcome by connecting all anodes to a wire leading to a Cu plate lying in a pond. J. H. MOORE.

Apparatus for Determining the Hexabromide Number of Oils. C. NIEGEMANN. *Chem. Ztg.*, **35**, 1131.—An Erlenmeyer flask of about 200 cc. capacity, with ground stopper through which passes the stem of the drop-funnel for adding Br to the Hehner-Mitchell method. J. H. MOORE.

The Westinghouse-LeBlanc Air Pump. ZUEBLIN. *Elektrotechn. Z.*, **32**, 1012. C. G. F.

Sensitiveness of Minerals to Electric Waves (SCHEIBT). **8.** Sampling Waste Waters (MEYER). **14.** Rapid Electroanalysis (FISCHER). **7.** Measurements of Gases (THOMAS). **21.**

U. S., 1,005,339, Oct. 10. C. SIEBERT and A. KÜHN, Cassel, Ger. **Thermometer for high temperatures,** comprizing a capillary tube with a bulb of transparent quartz glass, a bulb container of transparent quartz glass fused to the bulb, a scale-tube enveloping the upper part of the capillary thermometer tube and made of transparent quartz glass, and a tubular case of opaque quartz glass enveloping the intermediate part of the capillary tube and fused to the bulb container and the scale tube.

U. S., 1,005,865, Oct. 17. J. H. MINER, Lumberton, Miss. **Acetylene generator.**

U. S., 1,005,930, Oct. 16. J. BORDEREL, Paris, France. **Bunsen burner** having a lower shell for delivering mixed gas and air, and a perforated disk at the top the perforations of which are tapered from opposit faces of the disk inward to a point between the faces.

U. S., 1,006,757, Oct. 24. E. F. KAPUS, St. Joseph, Mo. **Acetylene generator.**

U. S., 1,006,826, Oct. 24. H. C. BUSCHMANN, Indianapolis, Ind. **Carbide indicator for acetylene generators.**

U. S., 1,007,172, Oct. 31. H. ANGEBRANDT, JR., Toledo, Ohio. **Thermostatic temperature-regulator for glue heaters.**

Ger., 229,140, Feb. 25, 1909. R. VALLAT, Paris. **Rectification column** with caps covering the cooking capsules.

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2. GENERAL AND PHYSICAL CHEMISTRY.

JOHN JOHNSTON.

Obituary Notices. *J. Chem. Soc.*, 99, 1646–66.—F. K. Beilstein, Emil Erlenmeyer, Rudolph Fittig (cf. *C. A.*, 5, 670), H. H. Landolt and N. A. Menschutkin. E. J. C.

The Salt Content of Sea Air. W. HEUBNER. *Therap. Monatsh.*, **25**, 607. H. B. LEWIS.

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Theory of Valence. A. WERNER. Zürich. *Z. Elektrochem.*, 17, 601–9.—W. reviews our present knowledge in regard to valence, with particular reference to his own theories, and to those of Abegg, Ramsay, and Stark. W. D. HARKINS.

Historical Data Relative to Osmotic Force. Correction of Authors' Names. A. ROSENSTIEHL. *Bull. soc. chim.*, 9, 805–9.—The analogy between soln. and vaporization was pointed out first by Gay-Lussac, and not by Arago, as stated erroneously in an earlier communication (*Compt. rend.*, 70, 617 (1870)) cited by Cohen (*Z. Elektrochem.*, 16, 863 (1910)). J. JOHNSTON.

Dynamics and Kinetics. R. KREMANN. *Fortschritte Chem.*, 4, 265–77.—Review for the period Dec., 1910–July, 1911. J. J.

Optics of the Whole Spectrum. S. LORIA. Cracow. *Fortschritte Chem.*, 4, 255–63.—Review for the period July, 1910–Apr., 1911. J. J.

Apparent Paradox in the Kinetic Theory. P. GRUNER. *Ann. Physik*, 35, 381–8.—Mathematical. J. H. WILSON.

Classification of the Elements. TORIBIO CÁCERES. *Anales soc. españ. fis. quim.*, 9, 121–4.—C. proposes the following modification of a previous classification (Walker, "Introduction to Physical Chemistry," 1899) as permitting an appropriate arrangement of the rare gases and metals of the rare earths. The no. of periods, has been reduced from 7–6, the former 5th period being considered an inflexion of the first division of the real 5th period which latter includes as well the former 6th period. The part of the 5th period corresponding to the metals of the rare earths is embraced in the space between the Sc and Mn groups. C. says the reason for placing a portion of the 5th period in ascending order as regards increasing at. wt. is not entirely arbitrary and that he will explain this point further in a future note. An error in the at. wts. of A and Te is considered probable.

I.	II.	III.	IV.	V.				VI.
H	....	....	....	....	....	...	....	....
He	Ne	A	Kr	Xe	....	...	....	....
Li	Na	K	Rb	Cs	....	...	....	....
Be	Mg	Ca	Sr	Ba	....	...	....	Ra
....	....	Sc	Y	La	Tb	Dy	Yb	Th
....	....	Ti	Zr	Ce	Gd	...	Lu	....
....	....	V	Nb	Pr	....	Er	Ta	U
....	....	Cr	Mo	Nd	Eu	Tm	W	....
....	....	Mn	....	....	Sm	...	....	....
....	....	Fe	Ru	....	....	...	Os	....
....	....	Ni	Rh	....	....	...	Ir	....
....	....	Co	Pd	....	....	...	Pt	....
....	....	Cu	Ag	....	....	...	Au	....
....	....	Zn	Cd	....	....	...	Hg	....
B	Al	Ga	In	....	....	...	Tl	....
C	Si	Ge	Sn	....	....	...	Pb	....
N	P	As	Sb	....	....	...	Bi	....
O	S	Se	Te	....	....	...	....	....
F	Cl	Br	I	....	....	...	....	....

H. S. PAINE.

The Atomic Weight of Argon. TORIBIO CÁCERES, *Anales soc. españ. fis. quim.*, 9, 139–41.—The figure 39.88 for at. wt. of A is considered probably incorrect on account of error in detn. of d., etc.; the relations as to at. wt. of the elements He, Li, Ne, Na, Kr, Rb, Xe, Cs make it probable that the at. wt. of A is nearer 36 (which would make A fit better in the table above (see previous abstr.)). 15.7, or a multiple thereof, is found to be very closely the difference in at. wt. between successive members of the same series in the above table. Differences greater than unity between

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the 1911 at. wts. and those calc. on this basis are found only in the last members of a series or in series which are situated near the middle points of the undulations of Meyer's curve; A, with a difference of 4.48, is the only exception. A is therefore located as in the above table and the at. wt. marked doubtful. H. S. PAINE.

Mode of Conduction in Gases. J. S. TOWNSEND AND OLIVER LODGE. *Phil. Mag.*, **22**, 556–8.—Townsend criticizes a recent article by Lodge (*C. A.*, **5**, 3192); the latter replies. ROBT. F. EARHART.

The Question of Valency in Gaseous Ionization. J. FRANCK AND W. WESTPHAL. Phys. Inst., Univ. Berlin. *Phil. Mag.*, **22**, 547–51.—Millikan and Fletcher's conclusions (*C. A.*, **5**, 2463) that Ra and Röntgen rays produce only ions with one positive or one negative charge is criticized, in light of the authors' previous work (*C. A.*, **3**, 2905) and that of Townsend (*C. A.*, **2**, 1656). A. T. CAMERON.

Isotherms of Monoatomic Gases and of their Binary Mixtures. VI. Coexisting Liquid and Vapor Densities of Argon; Calculation of the Critical Density of Argon. C. A. CROMMELIN. Leiden. *Proc. Akad. Wetenschappen Amsterdam*, **13**, 607–13 (1911) (English).—By combining his previous results (*C. A.*, **5**, 606) and the critical d. (0.509) with the values of the d. of liquid A obtained by Baly and Donnan (*J. Chem. Soc.*, **81**, 911 (1902)), and making use of the law of the rectilinear diameter, C. has constructed the curve representing the ds. of liquid and gaseous A. **VII. Isotherms of Argon between +20° and —150°.** H. KAMERLINGH ONNES AND C. A. CROMMELIN. *Ibid.*, 614–25.—The results for pressures ranging up to 60 atm. are presented in a series of tables and curves. **IX. Behavior of Argon with Regard to the Law of Corresponding States.** *Ibid.*, 1012–21.—A comparison of the isotherms of A with those of isopentane, Et_2O and CO_2, from which it appears that the behavior of A more nearly accords with the theory of van der Waals than that of any other gas which has been carefully examd., and that the reduced equation of state for monoatomic substances will show characteristic differences from the general mean equation previously obtained. J. JOHNSTON.

Further Experiments with Liquid Helium. H. KAMERLINGH ONNES. *Proc. Akad. Wetenschappen Amsterdam*, **13**, 1093–1113.—O. describes a liquid He bath, a const. vol. He thermometer, which he has used in investigating the vapor d., and the vapor pressure and d. of liquid He, at temps. down to about 1.5° abs. The d. of the liquid at 4.29° abs. is 0.122; it appears to pass through a max. value about 2.2°. With the same app., measurements were made of the elec. resistance of very pure Pt wire and of Au, Pb, Ag, at these low temps. The resistance diminishes considerably between liquid H and liquid He temps., and at the latter appears to be nearly constant. The author now considers that the resistance approaches zero as the temp. approaches the abs. zero, and probably does not pass through a minimum above this temp. J. JOHNSTON.

Further Experiments with Liquid Helium. C. The Change of Electric Resistance of Pure Metals at Very Low Temperatures. IV. Resistance of Pure Mercury at Helium Temperatures. H. KAMERLINGH ONNES. *Proc. Akad. Wetenschappen Amsterdam*, **13**, 1274–6; see *C. A.*, **5**, 3541.—The observations are in accord with the behavior predicted on the basis of the Planck theory. J. JOHNSTON.

Disappearance of the Electrical Resistance of Mercury at Helium Temperatures. H. KAMERLINGH ONNES. *Proc. Akad. Wetenschappen Amsterdam*, **14**, 113–5; *C. A.*, **5**, 3541. J. J.

Specific Heats of Gases and Vapors. R. THIBAUT. Berlin. *Ann. Physik*, **35**, 347–77.—Sp. heats were detd. at room temp. by measuring the ratio of the heats by a modification of Kundt's method, in which the gas was contained in sealed tubes.

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This enabled T. to make use of pure gases and of pressures other than atmospheric. Detns. were made with CO_2, SO_2, H_2S, CS_2, and Et_2O. The sp. ht. of Et_2O, C_6H_6, EtOH, MeOH and $CHCl_3$ was detd. directly at about 350° in a gas calorimeter. The results at ordinary temps. agree well with those of others. It was found that: The ratio of the heats is often different by several per cent. at 0.3 atm. and at 1 atm. At high temps. the values of C_p are in the order of the number of ats. in the mol., but at lower temps. the mol. wt. has an effect, tending to increase C_p. Hence with higher average at. wt. C_p increases less rapidly with the temp. W. P. WHITE.

Properties of Steam. R. SCHUELE. *Z. Ver. deut. Ingen.*, 55, 1561.—A compilation of S.'s most recent data on the physical properties of steam. Numerous tables and curves are given. C. G. FINK.

Heat of Evaporation of Water. A. W. SMITH. Univ. Mich. *Physic. Rev.*, 34, 173–83.—By evapg. water at 98° into a stream of air, the possibility of error from carrying of small water particles was avoided. Numerous other precautions are described; the probable (accidental) error of the detns. is 0.025%. The latent heat at 100° is 540.70 mean cal. per g. If the water is allowed to boil, the usual value, about 4 units lower, is obtained. It thus seems that all of the accepted detns., which were made by the b. method, are too low owing to imperfect dryness of the steam. W. P. WHITE.

The Diffusion of Oxygen in Water. TOR CARLSON. Phys. Chem. Lab., Nobel Inst., Stockholm. *J. Am. Chem. Soc.*, 33, 1027–32.—Measurements of the rate of diffusion at 18.2° of O_2 and of CO_2 in H_2O gave the values, $k = 1.720$ and 1.475 resp. (k being taken as sq. cm. per 24 hours). These values agree well with those of Stefan and Hüfner. The ratio of these numbers is 1.166, a result which closely approximates to that calc. from the rates of escape of the gases from soln., and also to that given by the so-called Exner rule. L. H. ADAMS.

Experimental Studies in Thermocalorimetry. R. MELLECOEUR. *Ann. chim. phys.*, [8] 23, 556–66.—The *thermocalorimeter* is an app. suggested by Régnault, and appears to be so called because it is a combination of thermometer and calorimeter. In the present case large alc. thermometers were so made that their double-walled bulbs enclosed cavities in which from 10–30 cc. of various liquids could be placed. The heat was detd. by the well-known cooling method, that is, from the time rate of cooling in an inclosure of const. temp. The accuracy attained was from 0.5–1.0%. An anomaly was found in the sp. ht. of H_2O near 0°. W. P. WHITE.

Temperature Measurement by the Aid of the Clapeyron-Clausius Equation. F. HENNING. Friedenau. *Ber. physik. Ges.*, 1911, 645–50.—Any consequence of the second law of thermodynamics can be used to det. abs. temp. The C.-C. equation can be so used; it calls for a knowledge of: Heat of vaporization, vols. of vapor and solid or liquid, and satn. pressure for the temp. in question and for any other known temp. The possible error is compensated for different cases and the conclusion is drawn that, proceeding to lower temps. from the b. p. of He, the method is more accurate than the gas thermometer. Adequate data exist at present for the application of this method only in the case of H_2O. There the max. error is 0.03° between 100° and 140°. W. P. WHITE.

Measurement of Surface Tension by the Method of Capillary Rise. J. E. VERSHAFFELT AND L. VAN DER NOOT. *Bull. sci. acad. roy. belg.*, 1911, 383–94.—It is shown, mathematically and experimentally, that if the heights to which different liquids rize in capillary tubes are plotted as functions of the radii of the tubes, the curves for the different liquids will have the same form and when multiplied by $1/\alpha$, where α is the capillary const. of the liquid, will coincide. If this const. is known for 1 liquid,

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therefore, it can be found for another by measuring the heights to which the 2 liquids will rize in tubes of different diameters and detg. by what factor the ordinates of the 2nd curve must be multiplied to make it coincide with the first. The same holds true for the curves obtained by plotting the minor axes of the ellipse formed by the meniscus against the major axes (radii of the tubes). The data are, however, not yet either accurate or numerous enough to permit of calc. the value of the fraction m in the equation $\alpha = {}^1/_2dgr(h + mr)$. For the experimental verification of these views, H_2O, C_6H_6, Et_2O and CS_2 in tubes having radii of 0.094–1.56 mm. were used.

CHAS. A. ROUILLER.

Experimental Investigation of the Surface Tension at the Contact of Two Liquids. L. VAN DER NOOT. *Bull. sci. acad. roy. belg.*, 1911, 493–502.—Using the method proposed in the preceding abstr. the author finds for the surface tension of $PhNO_2$ in contact with air the value 44.1 dynes/cm.; for the system H_2O–C_6H_6, 21.0; H_2O–Et_2O, 10.0; H_2O–CS_2, 38.4; H_2O–$PhNO_2$, 23.0. CHAS. A. ROUILLER.

The Dielectric Constants of Some Liquids at High Pressures. RUDOLF ORTVAY. Physik. Inst., Univ. Kolozsvar. *Ann. Physik*, 36, 1–24.—The dielec. consts. of certain liquids were detd. by a differential modification of Nernst's method, and at pressures as high as 500 kg.-cm^2. The dielec. const. increases at a decreasing rate with increase of pressure according to the equation $k_p = k_1(1 + \alpha p + \beta p^2)$, where α is positive and β negative. The liquids used comprized Et_2O, C_6H_6, xylene, toluene, CS_2, $CHCl_3$, paraffin oil, petroleum ether and castor oil; the values of the coeffs. are given.

W. D. HARKINS.

The Value of the Critical Quantities. J. D. VAN DER WAALS. *Proc. Akad. Wetenschappen*, 13, 1211–31 (1911) (English).—A theoretical discussion. J. J.

Critical Phenomena of Dissolution of Mixtures Examined under Variable Pressure. J. TIMMERMANNS. Amsterdam. *Proc. Akad. Wetenschappen*, 13, 507–26 (English).—The effect of pressure on the critical soln. temps. of mixts. of cyclohexane and aniline (31.05°), nitrobenzene and hexane (21.00°), nitrobenzene and isopentane (32.20°) was investigated for pressures ranging up to 250 atm. For the first pair, the crit. soln. temp. rizes with the pressure; for the other two pairs it falls; the variations are in accordance with laws which had been deduced from theoretical considerations. The *b. p.*, *f. p.* and *d.* of the pure constituents were detd. as follows: *Isopentane*, 27.95°, —158.55°, 0.63942; *normal hexane*, 68.95°, —, 0.67713; *cyclohexane*, 80.75°, 6.5°, —; *aniline*, 184.40°, —6.17°, 1.03895; *nitrobenzene*, 210.85°, —8.70, 1.22290. J. J.

The Emission of Electrons during Chemical Reactions. F. HABER AND G. JUST. Inst. physik. Chem., Karlsruhe. *Ann. Physik*, 36, 308–40.—This paper presents experimental evidence to show that chem. reactions between alloys, or amalgams of the alkali metals, and gases which react readily with them, are accompanied by the splitting off of negatively charged electrons. In 1909 (*C. A.*, 4, 141) the writers found that alloys of K and Na, and amalgams of Na or Li, if under an elec. potential when they react with an active gas such as $COCl_2$ at ordinary temps. and pressures and in complete darkness, give off a swarm of negatively charged particles; later (*C. A.*, 4, 2242) they found that this result was not obtained when inactive gases, such as H, were used. In the present expts. no foreign gas was present, and the active gas was kept under extremely low pressures by the use of liquid air. The alloy or amalgam was carried upward into the reaction tube by a Ag capillary under such conditions that no film, either visible or invisible, was present on the surface of the drop of alloy at its first instant of formation. The electrons from the reaction between Na–K alloy and $COCl_2$ have an initial velocity and so escape spontaneously. Amalgams of Li, K, and Cs, give off heavy negative carriers, which may consist of particles of charged

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Hg vapor. These show no initial velocity, are not deflected by the magnetic field, and are only perceptible under a potential fall of about 1–2 v. per cm. The action of the dil. $COCl_2$ on Na–K alloys gives an answer to Landolt's problem as to a possible loss of mass during chem. reactions. However, the hardness of the rays is not sufficient to have enabled them to escape through the solid walls of the reaction vessels used by Landolt. For such reactions the ordinary stoichimetrical equations no longer suffice, since fragments of atoms (electrons) appear among the reaction products. The strength of the effect seems to run parallel to the energy of the chem. reaction. It was calc. that in this reaction the max. amt. of electricity obtained was 65 coulombs from the formation of 1 mole KCl; this is small in comparison with one faraday, but it is possible that not all the electricity liberated in the form of electrons is perceptible. The radioactive radiation of K is too small to effect the results obtained. When the dil. gas was absent there was no effect, although 10^{-14} amp. could be measured; under the same conditions the action of the gas gave as much as 4×10^{-8} amp. If the effect were of photoelec. character, the film of alkali chloride invisible to the eye must be more than a million times as sensitive to light as the film-free surface. No light effects were obtained which were visible or which would affect a sensitive photographic plate. The K–Na alloy, when it reacts with $COCl_2$ in a high vacuum, acquires a positive potential of about 1 v. W. D. HARKINS.

Dynamic Isomerism. ANON. *Chem. News*, 104, 140–1.—Report of committee of British Assn. In a previous report the view was put forward that a curve of general absorption might be produced by a band situated in such a position as to be inaccessible to ordinary methods of exam. The position of these bands were studied by means of the magnetic rotatory dispersion. "The optical properties of the majority of sat. C compds. are detd. by an absorption band in the far ultraviolet, λ 1300–1400; this appears to represent the extreme limit of transmission in the case of compds. containing C, H, and O. The shallow absorption bands which appear in the near ultraviolet region, at λ 3000–4000 in the case of substances such as acetone are almost without influence on the optical properties of these substances in the visible region. The dominant absorption may, however, be brought nearer the visible region by introducing an ethenoid linkage, as in allyl alc., or a benzenoid nucleus as in phenyl Et carbinol; but in none of the simple compds. of which the magnetic rotatory dispersion has been detd. does the dominant absorption fall within the region usually photographed in the study of absorption spectra. GEORGE W. MOREY.

The Colorimetric Dilution Law. A. HANTZSCH. *Ann.*, 384, 135–42.—According to Beer's law the amt. of light absorbed by a colored substance in soln. is proportional to its conc.; provided that no chem. change takes place when the soln. is diluted. Piccard (*C. A.*, 5, 3444) uses the law of mass action to develop the idea that Beer's law holds when isomeric dissolved forms are present in soln., but is invalid where polymeric forms exist. Hantzsch gives 5 cases where there is chem. proof that the dissolved substance exists in the soln. in a condition of isomerism, but where the solns. do not follow the law. He concludes that it cannot be claimed that polymeric forms exist in a soln. which does not obey Beer's law. W. D. HARKINS.

Mutual Action of Associated Liquids. A. DOROSHEVSKII. Moscow. *J. Russ. Phys. Chem. Soc.*, 43, 46–66.—It was previously shown (*C. A.*, 5, 410) that the amt. of contraction observed upon mixing EtOH with H_2O is not in accord with Van Laar's assumption that the contraction is due to a change from associated to normal mols.: $(EtOH)_2 = 2EtOH$. Expts. of many authors are cited showing that in many cases the mixing of EtOH with non-associated liquids (AcMe, $CHCl_3$, Et_2O, C_6H_6 and CS_2) is accompanied by dilatation instead of contraction, and that the heat change accompanying contraction is sometimes positive, sometimes negative, while according

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to Van Laar's theory it should always be positive. Moreover, as shown by mol. wt. detns., in some solns. of alc. in non-associated solvents (C_6H_6, $PhNO_2$) the alc. is even more associated than in the free state. D. detd. the sp. gr. and n_D^{15} of mixts. of the following pairs of alcs. of similar character: MeOH + (*iso*)ButOH, EtOH + *n*PrOH, MeOH + *n*PrOH, MeOH + EtOH and EtOH + (*iso*)ButOH. The following conclusions are drawn: Mixing of the above pairs is accompanied by dilatation, the amt. of dilatation increasing with the difference between the mol. wts. of the components. In general the dilatation is proportional to the no. of mols. of the components: $dv = m_1m_2$. n_D^{15} of the mixts. is usually smaller than is required by the addition rule; the mixts. therefore behave as if they were under diminished pressure. Hence the degree of association is increased: $mA = (A)m$. This is in accord with the results of an exam. of the heat effects and vapor tension changes accompanying the mixing of the above pairs of alcs. H. M. GORDIN.

Some Properties of Aqueous Solutions of Trimethylcarbinol. A. DOROSHEVSKII. Moscow. *J. Russ. Phys. Chem. Soc.*, **43**, 66–73; cf. preceding abstr.—The Me_3COH made by Perkin's method (*J. prakt. Chem.*, **31**, 508) is contaminated with a hydrocarbon b. 47–50°. Pure anhydrous Me_3COH was made by means of CaO; m. 25.0–.5°, b. 82.55°; d_4^{25} 0.7806. The d_4^{20} and d_4^{25} and the n_D^{25} of its aq. solns. were detd. The following conclusions are drawn: The diln. of this alc. with H_2O is accompanied by contraction (dv) which in strong solns. increases, in weak solns. (below 70%) decreases with the temp. (in the case of EtOH the reverse is true). In weak solns. the contraction is greater than for other alcs. of the same conc. The experimental values of n_D^{25} agreed with those deduced from the Gladstone-Pulfrich formula. H. M. G.

Volume Effects during Processes of Solution. HERMANN WOLFF. Davos. *Ann. Physik*, **36**, 177–82.—W. develops differential equations for the change of free energy caused by the soln. of a liquid or a solid, using for the development of the equations Kirchoff's method of considering that the components are distilled isothermally. The vols. of the liquids or solids, and the contraction or dilatation during the process of soln. are taken into account in order to develop the more general forms of the equations. No experimental data are given. W. D. HARKINS.

Alkalinity of Aqueous Solutions of Carbonates. F. AUERBACH AND H. PICK. *Arb. Kais. Gesundh.*, **38**, 243–74 (1911).—The authors detd. $[H]_i$ for solns. of Na_2CO_3 and $NaHCO_3$, and various mixts. of these salts, by colorimetric comparison with standards prepared on the basis of Sörensen's e. m. f. measurements (*C. A.*, **5**, 3835). The standards were prep. from the following mixts.: $Na_2B_4O_7$ + HCl; $Na_2B_4O_7$ + NaOH; and glycocoll + NaOH. The indicators employed in the comparisons were α-naphtholphthalein, phenolph., thymolph., and alizarin yellow R. Several of Sörensen's solns. were confirmed electrometrically. The H electrode could not be employed in $NaHCO_3$ solns. owing to expulsion of CO_2 by the stream of H; but in Na_2CO_3 solns. results were obtained in fair agreement with the colorimetric values. $[OH]_i$ for the various solns. was calc., using $K_w = 0.64 \times 10^{-14}$. From these results $K_2 = [H][CO_3]/[HCO_3]$ was calc., giving as the most probable value $K_2 = 6.0 \times 10^{-11}$; in accord with McCoy's value (6.0×10^{-11}), but differing from the result (1.3×10^{-11}) calc. by Bodländer from Shields' expts. upon the sapon. of esters. Consideration of Shields' figures shows that he had made an error in his calculations, correction of which led to the value $K_2 = 6.4 \times 10^{-11}$. Similar consideration of Koelichen's results gave the value $K_2 = 6.6 \times 10^{-11}$. The round number 6×10^{-11} was employed for the calc. of the degree of hydrolysis of Na_2CO_3 solns. at 18° and 25°. For $NaHCO_3$ solns. [OH] is independent of the conc. being equal to $K_w/\sqrt{K_1.K_2}$, *i. e.*, 1.5×10^{-8} at 18° and 2.5×10^{-8} at 25°. W. BLUM.

Osmotic Pressure and Conductivity of Aqueous Solutions of Congo Red and Re-

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versible Membrane Equilibria. F. G. DONNAN AND A. B. HARRIS. *J. Chem. Soc.*, 99, 1554–77.—Measurements have been made of the osmotic pressure (π) and cond. of solns. of Congo red in order to throw light on the mol. state of this substance in soln. Parchment paper supported by perforated Ag plates was used in the osmometer as membrane and precautions were taken to keep the external liquid free from CO_2. In the preliminary expts. the cell was charged with a soln. of Congo red, containing considerable quantities of NaCl. When the external water was changed there occurred a rapid rise in π which was succeeded by a slow fall. The max. value of π against pure water seemed to show that Congo red exists in soln. as simple and undissociated mols. It was found that after some time the soln. within the cell became muddy, showing the presence of a colloidal suspension. It appears that Congo red and also benzopurpurine–4B undergo a so-called "membrane-hydrolysis," Na and OH ions diffusing out through the membrane and the free acid salt being thrown out of soln. within the cell. By surrounding the cell with a soln. of NaOH of definit conc. it is possible to prevent the hydrolysis. Moreover this hydrolysis will account for the gradual fall of π when pure water is used. Addition of NaOH or NaCl to a soln. of the dye lowers π, the effect increasing with the conc. of the electrolyte. In spite of the fact that the values of π indicate the absence of any ionization, the results of the cond. measurements on similar solns. would seem to show that Congo red is a highly dissociated electrolyte. It is possible that the pressures observed in the cell do not correspond with a true osmotic equil. When there is a certain conc. of Na and OH ions external to the cell it is possible to realize a true equil., but under such conditions the Na ions do not contribute to the observed pressure. Finally, although parchment is permeable to both Na and Cl it is found that when Congo red is present on one side of a membrane NaCl does not distribute itself equally on both sides, but is found in greater conc. outside the cell. This phenomenon will account for the apparent lowering of π of Congo red solns. on the addition of NaCl and NaOH. J. HUNT WILSON.

The Second and Third Dissociation Constants of Orthophosphoric Acid. E. B. R. PRIDEAUX. Muspratt. Lab., Univ. Liverpool. *J. Chem. Soc.*, 99, 1224–30; *Proc.*, 27, 121.—Detns. were made of the H^+ conc. at 16° in various phosphate solns. over the range of 1–3 mols. NaOH to 1 mol. H_3PO_4 (*i. e.*, NaH_2PO_4 to Na_3PO_4) by measuring the e. m. f. of the H electrode in these solns. against the H electrode in HCl solns. (usually 0.01 *N* HCl). The diffusion potential was eliminated by using satd. KCl as the connecting soln. This was shown to give the same results [probably within 2 millivolts.—ABSTR.] as 2 other methods of eliminating the diffusion potential, (1) interposing satd. solns. of NH_4NO_3 (when the phosphate solns. were acid) and (2) making each soln. 0.1 *N* with respect to NaCl and interposing 0.1 *N* NaCl between these 2 solns. The results agree fairly well with those previously obtained by Salm. The 2nd and 3rd ionization consts. were calc. to be $k_2 = [H^+][HPO_4^{--}]/[H_2PO_4^-] = 2.0 \times 10^{-7}$ and $k_3 = [H^+][PO_4^{---}]/[HPO_4^{--}] = 3.0 \times 10^{-12}$. The value $k_2 = 1.95 \times 10^{-7}$ obtained by Abbott and Bray (*C. A.*, 3, 2524) by a completely independent method agrees well with the present result, but the value $k_3 = 3.6 \times 10^{-13}$ obtained by the same authors is considerably lower than the present result. The ionization values of the various salts obtained by Abbott and Bray from cond. measurements were accepted by P. and in the mixts. were assumed to depend on the total salt conc.

W. C. BRAY.

The Conductivities, Temperature Coefficients of Conductivity and Dissociation of Certain Electrolytes. H. H. HOSFORD AND H. C. JONES. Johns Hopkins Univ. *Am. Chem. J.*, 46, 240–78.—The mol. conds. of 15 inorg. salts at 0°, 12.5°, 25° and 35°, and of 16 inorg. salts at 35°, 50° and 65° were measured by the Kohlrausch method at concs. less than 0.5, 0.25 or 0.125 *N*. The temp. coeffs. of cond., both in cond.

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units and in percentages, were calc. for these salts through the range of temp. above stated. The numerous precautions taken to obtain accurate results are described in detail. It is to be noted, however, that the solns. of each salt appear to have been obtained by dilution from a single mother soln. Each tabulated result is stated to be based on 2 to 4 measurements with the same soln. at the temp. in question, but no completely independent check measurements are recorded. The results are expressed in Siemens' units. "Percentage dissociations were also calc. in all cases when the data were sufficient," [but these are based on the arbitrary assumption that the salts are completely ionized at the highest dilution investigated, usually 4096 liters.—ABSTR.]. The dissociation decreased with increasing temp. except in 4 cases: $Na_4Fe(CN)_6.12H_2O$, $Ca(OOCH)_2$, and $Pb(OAc)_2$ at the low temps., and KOAc at the high. Among the salts investigated were: $CaCrO_4$, $Zn(NO_3)_2.6H_2O$, $Zn(OAc)_2$ at the low temps., and KSCN, $CaCl_2.6H_2O$, $MgCl_2.6H_2O$, $MnSO_4.4H_2O$, $FeCl_3.6H_2O$, $Ni(NO_3)_2.6H_2O$, $NiSO_4.6H_2O$, $CoSO_4.7H_2O$, $CuSO_4.5H_2O$. Some hydrated double salts were also studied, chiefly at the low temps.; $NH_4Al(SO_4)_2$, $KAl(SO_4)$, $NH_4Cr(SO_4)_2$, $K_2Ni(SO_4)_2.6H_2O$. The authors' conclusion that the double salt is usually present, especially in conc. solns., is based on the fact that the cond. of the double salt at a given conc. is less than the sum of the conds. of the sep. salts at the same conc. The cond. of green $NH_4Cr(SO_4)_2$ is considerably greater than that of the violet variety in the more conc. solns.; but is slightly less in the dil., which is probably due to the greater hydrolysis of the violet salt in the dil. solns. In agreement with earlier results obtained in the same lab., the salts of large hydrating power have large temp. coeffs. of cond.

W. C. BRAY.

The Conductivity, Temperature Coefficients of Conductivity and Dissociation of Certain Electrolytes in Aqueous Solution from 0° to 35°. Probable Inductive Action in Solution, and Evidence for the Complexity of the Ion. L. G. WINSTON AND H. C. JONES. Johns Hopkins Univ. *Am. Chem. J.*, 46, 368–413.—A study of 30 salts by the methods described in the preceding article: NH_4NO_3, $(NH_4)_2SO_4$, NH_4HSO_4, Na_2SO_4, borax, KOAc, $KMnO_4$, HK_2PO_4, $Sr(OAc)_2$, $MgBr_2$, $Mg(NO_3)_2$, $Mg(OOCH)_2$, $Mg(OAc)_2$, $CdCl_2$, $CdBr_2$, CdI_2, $PbCl_2$, $AlCl_3$, $Al(NO_3)_3$, $Al_2(SO_4)_3$, $Cr_2(SO_4)_3$, $MnSO_4$, $AgNO_3$, $CoBr_2$, $CuSO_4$, UO_2Cl_2, $UO_2(NO_3)_2$, UO_2SO_4, $UO_2(OAc)_2$. The results in general support the earlier conclusions, but there are some exceptions which lead the authors to propose the theory that there is an "inductive action" of the ion on the un-ionized mol. These exceptions are: The % ionization of CdI_2 increases with increasing temp.; $PbCl_2$ has a high temp. coeff. although it crystallizes without water of crystn., and therefore is a salt of small hydrating power; CdI_2 has about the same temp. coeff. as $CdBr_2$ and $CdCl_2$, although these two salts crystallize with water of crystn., and CdI_2 without. The high values of the temp. coeff. of the sulfates are attributed to a tendency of sulfates towards polymerization.

W. C. BRAY.

The Calculation of Chemical Equilibrium from Measurements of Reaction Velocity. A. SKRABAL. Wien. *Z. Elektrochem.*, 17, 665–8.—The reaction $I_2 + OH^- \rightleftarrows IOH + I^-$ is rapid but the equil. is not stable owing to later slower formation of iodate. The velocity of the reaction $3IOH + 3OH^- \rightleftarrows 2I^- + IO_3^- + 3H_2O$ in strongly alk. solns. was found by Forster (*J. Phys. Chem.*, 7, 640) to obey the equation $-d[IOH]/dt = K_a[I^-][IOH]^2/[OH^-]$. S. interprets this by assuming that there is first a relatively rapid reaction $2IOH + I^- \rightleftarrows I_2OH + OH^-$ whose equil. const. $K_1 = [I^-][IOH]^2/[I_2OH][OH^-]$, followed by a slower change of I_2OH into IO_3^- by reaction with OH^-, which dets. the velocity of the main reaction. Consequently $-d[IOH]/dt = K'[I_2OH]$ and $K' = K_1K_a$. In carbonate-bicarbonate soln. the reaction $3I_2^- + 6OH^- \rightleftarrows 8I^- + IO_3^- + 3H_2O$ occurs and has been found (*C. A.*, 5, 2591) to obey the equation $-d[I_2^-]/dt = K_b[OH^-][I_2^-]^3/[I^-]^2$. This is inter-

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preted by assuming a rapid reaction $2I_3^- + OH^- \rightleftarrows I_2OH + 3I^-$ whose equil. const. $K_2 = [OH^-][I_3^-]^3/[I_2OH][I^-]^3$, followed by a slower change of I_2OH into IO_3^- as before. Consequently $-d[I_3^-]/dt = K''[I_2OH]$ and $K'' = K_2K_b$. Since the slow reaction which dets. the velocity is the same in both cases $K' = K''$; therefore $K_1K_a = K_2K_b$. S. finds experimentally $K_a = 87$ and $K_b = 2$ at 25°. Combining this with $[I_2][I^-]/[I_3^-] = 1.33 \times 10^{-3}$, S. obtains $[I_2][OH^-]/[IOH][I^-] = 0.9 \times 10^{-2}$. Bray (*C. A.*, 4, 2758) by direct measurement obtained 1.7×10^{-2} for this equil. const. [Bray's latest result (*C. A.*, 5, 3646) is 3.4×10^{-2}.—ABSTR.] In a similar manner the const. of the reaction $IO_3^- + 8I^- + 3H_2O \rightleftarrows 3I_3^- + 6OH^-$ is calc. to be 7×10^{28}, while Sammet's measurements give 6×10^{28}. S. concludes that in this reaction the intermediate ion $I_2O_2^-$ is formed by a rapid reaction. From measurements of the temp. coeffs. of the reaction velocities, S. calcs. the equil. const. at another temp. and hence the heat of the reaction. He considers that this method is more valuable for detg. the mechanism of reactions than for calc. new equil. consts.

GRINNELL JONES.

Equilibrium in the System: Zinc Nitrate, Ammonia and Water. N. STASEVICH. Univ. Warsaw. *J. Russ. Phys. Chem. Soc.*, 43, 354–62.—On gradually adding NH_3 to a soln. of $Zn(NO_3)_2$ a ppt. appears which at first increases, then decreases in amt. An exam. of the ppt. and the soln. at different stages of the reaction showed that in the decreasing region of pptn. the latter varies not only in amt. but also in comp. with the amt. of NH_3 added. Hence the ppt. is neither a definit chem compd. nor a mechanical mixture of $Zn(OH)_2$ and $Zn(NO_3)_2$. It must be regarded as an adsorption compd. (compd. of 2nd order, Kurilov, *Ibid.*, 38, 820). The usually given equation, $Zn(NO_3)_2 + 2NH_4OH = Zn(OH)_2 + 2NH_4NO_3$, holds good only for the region of increasing pptn.; the view that the solubility of Zn salts in excess of NH_3 is due to formation of complex salts requires further investigation.

H. M. GORDIN.

Polarimetric Avidity Determinations of Weak Bases in Non-aqueous Solutions. E. RIMBACH AND H. VOLK. *Z. physik. Chem.*, 77, 385–410.—In order to det. the relative affinity of weak bases in non-aq. solns. the authors have employed a method first proposed long ago by Jellet (*Trans. Irish Acad.*, 25, 375). Since there is a difference in the value of the rotation for an optically active alkaloid and one of its salts it is possible by means of polarimetric measurements to det. the partition of an acid between an active and an inactive base. In the present work cinchonidine is used as the active base, and as inactive bases a large number of primary, secondary, and tertiary amines, both aliphatic and aromatic. The cinchonidine was in the form of nitrate, and either MeOH or EtOH was used as solvent. Possible disturbing factors such as the influence of the solvent, mutual influence of the 2 active substances (active base and its salt), and influence of the inactive base on the rotation were carefully investigated and suitable corrections applied. Tables are included giving data of 58 measurements in EtOH and of 15 in MeOH. In many instances the value of the const. k is the mean of several detns. at varying concs. The values of k obtained at different concs. do not agree very well together; a very small error, however. in reading the polarimeter gives rize to a large error in the value of k. Since $k = x^2/(1-x)$, where x represents the amt. of cinchonidine set free from the nitrate, it follows that $\sqrt{k} = x/1-x$, hence values of $\sqrt{k}$ are given in the tables from which may be readily calc. the magnitude of x. The smallest value for $\sqrt{k}$ in EtOH is found with $(CH_3)_3N$, 1.11; in MeOH with dibenzylamine, 0.99. The highest values in both alcs. are given by $EtNH_2$, 15.35 and 13.93, resp. Replacement of an H in NH_3 by Me increases the avidity of the base, but unlike the results in aq. solns., the addition of the second and third Me causes a decrease. Substitution of Et in place of Me causes a greater rise, which falls as one passes to propyl and butylamines. In EtOH the mono deriv. is

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always the strongest base. In attempting to account for the want of parallelism between the series in H_2O and the alcs. the authors refer to a suggestion of Walker that the dissociation const. of a base represents not only the equil. between OH^- and undissociated base, but is a function also of the degree of hydrolysis. J. HUNT WILSON.

Electrical Conductivity of Non-aqueous Solutions. VIII. Aluminium Bromide and Nitrobenzene. V. A. PLOTNIKOV. Polytechn. Inst., Kiev. *J. Russ. Phys. Chem. Soc.*, **42**, 1589–96.—Measurements of the elec. cond. of $AlBr_3$ in $PhNO_2$ at 18° show that the cond. at first rizes with the conc., reaching a max. at 19%, and then continually falls, the curve being nearly symmetrical. The mol. wt. of $AlBr_3$ is only ½ as large in $PhNO_2$ as in CS_2. Its elec. cond. increases with the diln.; hence $AlBr_3$ in $PhNO_2$ is dissociated to a rather large extent. As $PhNO_2$ is not associated. these results contradict the assumption that the degree of dissociation of a solute is influenced by the degree of association of the solvent. The constitution of the electrolyte is supposed to be $Al_2Br_3.2PhNO_2$. H. M. GORDIN.

Regularity of Composition of Eutectic Alloys. K. LOSEV. *J. Russ. Phys. Chem. Soc.*, **43**, 375–92.—A microstructural exam. of alloys of Sb with Ni or Co containing 0–28% Ni or 0–33% Co showed that there are no real eutectics in the neighborhood of the m. p. of Sb in the alloys rich in Sb. Hence these alloys present no exception to Gorbov's rule that eutectics are expressible by chem. formulas (*C. A.*, **5**, 1225). The alloys of Sb and Ni show the peculiarity that when they contain 57–92.5% Ni they show a second temp. halt at 677°. This is due to the formation of crystals of Ni_4Sb from 2 kinds of solid satd. mixtures. H. M. GORDIN.

Chemical Formulas of some Eutectics and Transition Points. A. GORBOV. St. Petersburg. *J. Russ. Phys. Chem. Soc.*, **42**, 1517–29.—As further support of his theory (*C. A.*, **5**, 1225) the author gives formulas for a large number of eutectics gathered in the literature. H. M. GORDIN.

Fusibility Curves of Gaseous Mixtures: Oxonium Systems Composed of Acetylene, Ethylene, or Nitric Oxide with Methyl Ether. GEORGES BAUME AND ALBERT F. O. GERMANN. *Compt. rend.*, **153**, 569–71.—A study of the above systems shows that the following *oxonium compds.* are formed: $Me_2O.C_2H_2$, stable in contact with the soln., $Me_2O.C_2H_4$ and $Me_2O.2NO$, which melt with decomp. GEO. W. MOREY.

The Gradation of Intensity in the Properties of Chemical Compounds and Addition Products. B. KURILOV. Univ. Warsaw. *Chem. Ztg.*, **35**, 1005.—It is pointed out that chem. compds., addition products, alloys, minerals, adsorption compds., etc., can be classified according to whether or not they obey one or more of (1) the law of constant proportions, (2) the valence rule, (3) the law of mass action, and (4) the phase rule. GEORGE W. MOREY.

Method for Ascertaining the Homogeneity, that is the Number of Phases of a Substance. Application to Silver Mercuric Iodide. HENRIK WEGELIUS. Helsingfors *Z. physik. Chem.*, **77**, 587–90.—Since Ag_2HgI_4, and its change in color from yellow to red upon being heated, was discovered by Meusel, the question as to whether or not it is a pure compd. has been the subject of much discussion by various investigators. W. attacks the problem of the state of the double iodide at temps. above the inversion point (50°) from the standpoint of the phase rule. His method consists in detg. the solubility at 60.3° of Ag_2HgI_4 in KI-HgI_2 solns. of varying concs. At the given fixed temp. the system possesses 2 degrees of freedom. Therefore, since there are 4 components—AgI, HgI_2, KI, and H_2O—according to the phase rule, besides soln. and vapor, there is only 1 phase, namely, Ag_2HgI_4. This method is generally applicable and can be conveniently used for detg. the number of phases of many substances.

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This conclusion does not affect the question of the nature of the transformation of the yellow Ag_2HgI_4 into the red. L. H. ADAMS.

The Solubility of Hydrogen in Copper, Iron and Nickel. ADOLF SIEVERTS. Leipzig. *Z. physik. Chem.*, 77, 591–613; cf. *C. A.*, 2, 2480; 4, 137, 1951, 3030; 5, 2019.—The amt. of H taken up by the metals was measured at pressures up to 1.5 atm. and over the temp. range 400°–1600°. The app. used was essentially the same as that described in the former papers. At a given temp. and pressure the amt. of H taken up by a fixed wt. of metal is const.; in the case of Ni it was shown to be independent of the size of the metal surface. At a const. temp. the solubility in the solid or liquid metals is proportional to the square root of the gas pressure, except for pressures less than 100 mm., in which case, with decreasing pressure the amt. of H absorbed decreases somewhat faster than corresponds to this relation. With const. pressure the solubility rizes with increasing temp. Liquid Fe and Ni dissolve about twice as much and liquid Cu three times as much as the resp. solid metals. The temp. coeff. of the solubility in each case is greater for the liquid than for the solid. L. H. ADAMS.

The Distillation of Amalgams and the Purification of Mercury. G. A. HULETT. *Physic. Rev.*, 33, 307–16.—In a previous paper (*Ibid.*, 21, 288) it was shown that Hg may be completely sepd. from all the more easily oxidizable metals such as Zn, Cd, Bi, Sn, Cu, Pb, etc., by distilling with a current of air bubbling through the amalgam. The distn. was carried out at about 200° in a flask where the air pressure was about 25 mm. or about 5 mm. partial pressure of O. Any metallic vapor will completely oxidize under these conditions if the dissociation pressure of its oxide is less than the partial pressure of O maintained in the still. These oxides collect on the distillate, but when it is filtered through a pinhole in filter paper it is free from the metals. All of the above metals distil over with the Hg if air is not bubbled through the amalgam. Since the oxides of Ag, Au and Pt do not form under the above conditions, the distillation of conc. amalgams of these metals was carried out. An amalgam containing 6800 g. Hg and 35 g. Ag was distilled. The 1st distillate was found to contain about 2 parts of Ag to 1,000,000 parts of Hg. A 2nd distillate contained 0.05 parts Ag to 1,000,000. The 3rd distillate left no visible residue on distillation. The 1st distillate from an amalgam of 6.759 g. Hg and 45.5 g. Au contained 0.027 part of Au to 1,000,000 Hg. The 2nd distillate contained less than 0.01 mg. of Au in 6700 g. Hg. The 1st distillate from an amalgam of 6700 g. Hg and 12.25 g. Pt contained 0.067 mg. Pt. Since this amalgam always contained Pt in the solid phase the vapor pressure of Pt was calc. to be 0.00000026 mm. at 200°. "From this then each cc. of space or gas which is in equil. with Pt at 200° contains some 5 billion atoms of Pt." "The information gained in this and previous investigations give the essential conditions for obtaining pure Hg, and it may be questioned whether any single substance may now be prepared in as high a state of purity as Hg." H. gives data to prove that O is not sol. in Hg to an appreciable extent. Directions are given for the construction of a Hg still. J. L. CRENSHAW.

The Transverse Thermomagnetic Effect in Nickel and Cobalt. ALPHEUS W. SMITH. *Physic. Rev.*, 33, 295–306.—The relation between the Nernst e. m. f. and the magnetic field at a no. of temps. between 56° and 410° was examd. For a given magnetic field the e. m. f. increases with rizing temp. until the critical temp. has been reached, the rate of increase being greater nearer the critical temp.; in passing the critical temp. the Nernst effect sinks to a small fraction of its value at that temp. and then probably decreases with further rise in temp. For any given temp. below the critical temp. the Nernst e. m. f. is at first proportional to the field strength, but when the intensity of magnetization approaches its max. there is a rapid deviation from this proportionality and the e. m. f. approaches a limiting value at higher field strengths. The fields

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necessary to produce satn. become less as the temp. is increased. At temps. above the critical temp. the Nernst e. m. f. is proportional to the magnetic field. In Co the Nernst e. m. f. is proportional to the field between 56° and 550° over the range used in these expts. In Ni the Nernst effect increases more rapidly than the Hall effect with rizing temp., and in Co it increases less rapidly. In this respect Co behaves like Fe. J. L. CRENSHAW.

Heat of Combination of Acidic Oxides with Sodium Oxide. VII. W. G. MIXTER. Sheffield Chem. Lab., Yale Univ. *Am. J. Sci.*, **32**, 202–6.—In a previous paper (*C. A.*, 4, 3036) it has been shown that the heats of combination of acidic oxides with Na_2O is closely related to the at. wts. of the elements of a sub-group. The present paper is an account of detns. of the heats of combination of the peroxides of Cu, Ag, and Au. The metals or their oxides were burnt with Na_2O_2 and S. The results are as follows: $2(CuO_2) + (Na_2O)x$ = 59,000 cal.; $Ag_2O_2 + (Na_2O)x$ = 39,000 cal.; $Au_2O_3 + 3Na_2O$ = 101,000 cal. It is evident therefore that in the case of Cu, Ag, and Au, the relation mentioned above does not hold. The explanation given is that Ag is more basic than either Cu or Au, and hence does not fall in line with them. L. H. ADAMS.

The Determination of Three-phase Pressures in the System: Hydrogen Sulfide and Water. F. E. C. SCHEFFER. *Proc. Acad. Wetensch. Amsterdam*, **13**, 829–37; *J. Chem. Soc.*, **100**, II, 264.—The pressure has been measured at diff. temps. for the 3-phase systems (SLV), (SL'V), and (LL'V), where S represents a solid compd., L and L' liquid phases, and V the vapor. A quadruple point was found at 29.5° and 22.1 atm. A comparison of the pressure-temp. curves for the system (SLV) and (LL'V) with that representing the vapor pressure of pure H_2S indicates that they are nearly identical. E. J. CRANE.

Thermal Analysis in Quaternary Systems. I. N. PARRAVANO AND G. SIROVICH. Ist. chim. univ. Roma. *Atti accad. Lincei*, **20**, II, 206–11.—A description of a method for establishing, by thermal analysis, the regular tetrahedral diagram of quaternary systems whose components form neither compds. nor mixed crystals. The method is to be tested experimentally with Pb-Bi-Cd-Sn alloys. CHAS. A. ROUILLER.

New Experiments on the Formation of Esters. H. GOLDSCHMIDT. *Z. Elektrochem.*, **17**, 684–5.—According to G.'s view of the mechanism of esterification the alc. and the acid used as catalyst unite to form a complex which is partially dissociated into H ions and a complex ion. If only the complex ion takes part in the reaction it should be possible by introducing an electrolyte possessing a common ion to reduce the velocity practically to zero. If, however, the undissociated complex also participates in the reaction, the velocity, on the addition of the substance with a common ion, should reach a limiting value. G. has shown the latter to be the case with trichlorobutyric acid as catalyst, and gives results for picric acid which bear the same interpretation. Aniline picrate furnished the common ion. The equation for the velocity of esterification is $dx/dt = (k\xi + k'\xi')(a-x)$, where ξ and ξ' represent the conc. of the complex ion and undiss. complex resp., and k and k' the corresponding velocity consts. For 0.1 and 0.1 *N* solns. of picric acid, whose degrees of dissociation are 0.075 and 0.214, the quotient of the ion concs. is 3.5, while the quotient of the esterification consts., 0.162 and 0.035, is 4.63. If, however, there is subtracted from each const. the const. corresponding to the undissociated portion, the value of the quotient becomes 3.55, which agrees well with the ratio of the ion concs. This is also found to hold with phenylacetic acid. A brief discussion of the relation between the constitution of acids and the velocity of esterification is included. J. HUNT WILSON.

Reduction of Mercuric Chloride by Phosphorous Acid and the Law of Mass Action. J. B. GARNER, J. E. FOGLESONG AND R. WILSON. Wabash Coll., Crawfordsville,

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Ind. *Am. Chem. J.*, 46, 361–8.—The authors state that the reaction $2HgCl_2 + H_2PO_2 + H_2O = H_3PO_4 + 2HgCl + 2HCl$ takes place completely at ordinary temps., and that the complication due to the formation of metallic Hg is met with only at higher temps. They have measured the rate at 25° and at 30° by titrating with NaOH, using methyl orange as indicator, and have assumed that the increase in acidity is an exact measure of the HCl formed. The reaction is of the fourth order. [This conclusion must be questioned at present, since the integrated form of the equation $dx/dt = k(a-x)^4$ appears to have been applied to cases in which the reacting substances are not present in equiv. amts. The difficulty of interpreting the results is increased by the fact that concs. are not expressed in equiv. wts. per l.—ABSTR.] W. C. BRAY.

Rates of Solution of Certain Metals in Dissolved Iodine, and their Relation to the Diffusion Theory. R. G. VAN NAME AND ROWLAND S. BOSWORTH. Kent Chem. Lab., Yale Univ. *Am. J. Sci.*, 32, 207–24.—The rates of soln. of Cd, Fe, Ni, and Co in similar I solns. (I in KI solns.) were found to be equal; the list of metals which dissolve at the same rate in I soln. now also includes Hg, Cu, Ag, Zn. The calc. velocity consts. are based on the variation of the I conc. as measured with $Na_2S_2O_3$ soln. In order to avoid hydrolysis and deposition of metallic hydroxides the solns. were made slightly acid. H_2SO_4 and HCl up to 0.1 *N* do not affect the velocity const.; above this conc. they cause a decrease in the rate. The rate of soln. of Sn is abnormally high, probably due to the formation of SnI_2 in 2 stages. The velocity const. for Fe containing C is higher than for pure Fe; this is probably due to a short circuit effect. The soln. of Mg is abnormally fast due to the stirring action of H bubbles set free from its surface. "The rates of soln. of Cd in the presence of 8 different iodides have been detd. Except in the cases of CdI_2 and HI the relative values of the velocity consts. roughly correspond with what would be expected from the probable rates of diffusion of the corresponding triiodides, as estimated from the available data." The results as a whole are considered to support the validity of the theory that the diffusion rate of I dets. the rate of soln. H. S. PAINE.

Adiabatic and Simultaneous Reaction Kinetics of Diazoacetic Ester. CHIL-HILARY LACHS. *Verhandl. Natur-Histor. Medizin. Vereins Heidelberg, N. F.*, 11, 45–114; through *Chem. Zentr.*, 1911, I, 1776.—The equation of Bredig and Epstein for time and temp. of a system adiabatically heated was tested in the case of the decomp. of diazoacetic ester. This equation holds only for a single reaction and the relations expressed by it are disturbed by experimental conditions such as inexactness in the measurements of temp. and time, heat losses, evapn. of the solvent, evolution of gas during the reaction and by internal causes such as side reactions. In the decomp. of diazoacetic ester in aq. 50% MeOH or EtOH soln. the side reaction produces no appreciable thermal disturbance and the course of the consts. is in accord with the equation. H. S. PAINE.

Rate of Coagulation of Colloidal Copper. H. H. PAINE. *Chem. News*, 104, 139.—The rate of coagulation of a colloidal Cu soln. prepd. by Bredig's elect. method, was studied by decanting the liquid from the pptd. gel. and titrating the Cu with HNO_3. After the initial period, during which the solns. remain clear, the rate of coagulation is proportional to the square of the initial conc. of the colloid for the irreversible coagulation produced with salts containing a divalent anion; with salts containing a monovalent anion the action is not irreversible and a more complicated relation holds. For varying amts. of the electrolyte the coagulation is proportional to some power of the conc. of the salt. GEORGE W. MOREY.

Theory of Colloids. H. FREUNDLICH. *Chem. News*, 104, 139–40.—An address. G. W. M.

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Ultramicroscopic Practice. C. THOMAE. Giessen. *Z. Chem. Ind. Kolloide*, 9, 19–20; *C. A.*, 4, 856, 3027.—Siedentopf finds that the green colloidal Au particles appear under the ultramicroscope to gain in brightness and size on standing, which he ascribes to a change to the oxide. T. ascribes the change to an increase in the size of the particle, a "coagulation" which may finally result in such large particles as to show the characteristic color of the material, as is the case in some dye solns.

H. ISHAM.

Sedimentation. C. BARUS. Providence. *Z. Chem. Ind. Kolloide*, 9, 14–6.—A brief review of work published by B. in various American journals during the last 25 yrs. H. ISHAM.

The Adsorption of Iodine by the Glucoside Saponarin. GEORGE BARGER. *Chem. News*, 104, 139.—The blue color of pure I soln. with saponarin hydrosol is developed with KI as well as by other salts, is destroyed temporarily by heating, and permanently by $Na_2S_2O_3$. If but little salt is added with the I soln. the blue adsorption compd. remains dissolved; further addition causes flocculation and pptn. of a dark blue gel. The conc. of salt required depends on the cation and is in accordance with Schultze's law. The cond. of the blue hydrosol is less than that of the KI contained in it, hence some of the KI is probably adsorbed. The I content of the hydrosol agrees with that calc. from the adsorption isotherm. GEORGE W. MOREY.

The Color Reactions of Iodine with Starch and its Hydrolytic Products. W. HARRISON. Manchester. *Z. Chem. Ind. Kolloide*, 9, 5–9; cf. *C. A.*, 5, 2769.—Since the amt. of I adsorbed by starch varies with the amount of foreign substance as *e. g.*, KI, present, a soln. of definit conc. of KI and I was treated with varying amts. of starch. The ratio between the adsorbed I (x) and that remaining in soln. (m), $X/m = Kc^n$; the value for the constants varied with the physical condition of the starch, raw starch adsorbing least, cooked more, and cooked and shaken starch most, owing to an increased degree of dispersion produced by this means. (1) The color of the starch iodide in aq. alc. depends on whether an aq. or an alc. starch soln. is used, but 2 solns. of like alc. conc. having different colors, depending on the original solvent for the starch, assume the same color when heated to 70° and cooled. The color changes from blue to yellow with increasing conc. of alc. (2) Heating changes the soln. from blue to yellow and (3) adding I to the yellow, boiling soln. changes the color to orange, red violet and blue; then (4) if this boiling blue soln. is diluted with water or starch soln. the color changes reverse. (5) Increasing amts. of starch in a KI soln. of I give colors ranging from yellow to blue. (6) Adding KI soln. to blue starch iodide changes the color to yellow, or if too much starch is present only to red. (7) Salts, with the exception of those which increase the solubility of I, intensify the colors. The starch acts as a colloidator for the I. Blue I solns. can be obtained momentarily when HIO_3 and HI react in water solns. The characteristic colloidating action of starch can be shown by adding NaCl to $AgNO_3$ in the presence of starch, when a colloidal AgCl is formed; on heating the soln. the AgCl is pptd., *i. e.*, starch loses its colloidating properties at high temp. These phenomena are explained as follows: (1) Alc. decreases the colloidating properties of the starch and increases the amt. of I in true soln. Before warming, the starch from an alc. soln. will be richer in alc. than the surrounding liquid is; after warming, the adsorbed and surrounding liquid are homogeneous. (2) At high temps. the colloidating action of starch is decreased, and the solubility of I is increased. (3) Adding more I to the hot soln. counterbalances the increased solubility of the I. (4) Adding hot water dissolves the I. (5) I concentrates inside the starch particle, so an excess of starch prevents the dissolving action of the water. (6) KI has same effect as heating. (7) Salts, by decreasing the solubility of I increase the amt. of colloidal I. Dextrin and starch cellulose can be made

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to give the same colors as starch, if sufficient I and KI are used. Ultramicroscopic investigations show that the change from starch to dextrin (by malt extract or boiling with dil. acids) is accompanied by an increase in the degree of dispersion, and since the same treatment gives blue color with these, as will bring back the blue with b. starch soln. (more dispersed starch) it is concluded that starch, starch cellulose and dextrin are the same substance in different degrees of dispersion, and that the max. of adsorptive action and minimum of dispersion fall together. This assumption can be used to explain the differences in solubility and pptn. by alc., of the dextrin, starch and starch cellulose. H. ISHAM.

Studies of Adsorption. S. J. LEVITES. St. Petersburg. *Z. Chem. Ind. Kolloide*, 9, 1–5.—Studies of the adsorption of $K_2Cr_2O_7$ and urea by animal charcoal, hide powder and coagulated egg albumin show good agreement with the formula $x/m = Kc^{1/n}$ when $n = 2$ if the conc. of the original soln. is more than 1.5%. Adsorption of $K_2Cr_2O_7$, Na_2SO_4 and K_2CrO_4 by gelatin is directly proportional to the conc. of the soln., or $n = 1$. In every case where albuminous material was used to adsorb $K_2Cr_2O_7$ a certain amt. of Cr_2O_3, varying with conditions and the material used, was formed by the action of light on the adsorption compd. H. ISHAM.

Adsorption. I. Chemical Hysteresis. A. V. RAKOVSKII. Central Chem. Lab, Ministry Finance, Moscow. *J. Russ. Phys. Chem. Soc.*, 43, 170–86; cf. Van Bemmelen, Die Absorption, Dresden, 1910.—Wheat starch, St. Vincent arrowroot and potato starch were gradually dehydrated by keeping them successively in atmospheres of successively diminishing H_2O vapor tension, produced by using H_2SO_4 of different conc., till the wts. remained const. under a given vapor tension. The completely dehydrated samples were then in the same way run backwards through a process of gradual hydration. For potato starch similar expts. were also made at 100–20°. The amts. of H_2O in the starches in both processes corresponding to definit vapor tensions are represented by curves from which the following conclusions are drawn: The curves are more regular than those of Van Bemmelen. The magnitude of hysteresis is considerably less than for inorganic colloids, not amounting to 2–3% for wheat starch. The curves for arrowroot and wheat starch are similar, while that for potato starch is more complex. Regarding aq. H_2SO_4 as a soln. of H_2O in $H_2SO_4.H_2O$ and starch gels as solns. of H_2O in starch, the temp. coeff. of the vapor tension of the H_2O is the same in both cases, and the force with which the first 15–16% H_2O (at 19°) combines is different from that with which the remainder of H_2O is combined. **II.** *Ibid.*, 186–201.—The hydration-dehydration curves of starch can be represented by the general equation, $y - a = b\sin(\sigma - \beta) + c\sin(\sigma - \beta_1)$, in which y is the vapor tension of H_2O in the starch gel, σ is the amt. of H_2O in the gel expressed in parts of 180, *i. e.*, the max. amt of H_2O in a given starch is taken as 180, so that if x_m is this max. and x the varying amt. of H_2O, $\sigma = 180\ x/x_m$; β and β_1 are nearly equal to 90; a, b and c are consts. **III. Analogy between Gels and Ordinary Solutions.** *Ibid.*, 362–74.—An exam. of solns. of H_2SO_4, NaOH, KOH, LiCl, $CaCl_2$, H_3PO_4 and $MgCl_2$ showed that, as in the case of starch gels, the relation between the vapor tension and the conc. of the H_2O can be represented by a sine curve, the divergences from this curve being explicable by the influence of ions and hydrates. H. M. GORDIN.

Observations on Electrophoresis. A. REYCHLER. St. Nicholas. *Z. Chem. Ind. Kolloide*, 9, 16–8; cf. *C. A.*, 5, 641.—Expts. on electrophoresis, using the Coehn app. (*C. A.*, 4, 138) modified so that an aq. layer could be placed above the electrolyte soln. in each arm of the tube showed anaphoresis with purified lampblack when E = 18 v., I = 0.05 milliamp., R = 335000 ohm, but cataphoresis with R = 5.6 megohms. With colloidal As_2S_3 anaphoresis occurs under both conditions. Colloidal

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Fe hydroxide shows cataphoresis under both conditions, though less marked under the second condition of increased resistance. H. ISHAM.

The Viscosity of Dispersoids. E. HATSCHEK. *Z. Chem. Ind. Kolloide*, **8**, 34–9; *Chem. Zentr.*, 1911, I, 946; cf. *C. A.*, **5**, 2458.—If the amt. of the disperse phase in an emulsion exceeds 74% the form of the particles approaches a decahedron. When layers of the liquid move past each other, as in a viscosity detn., the particles are distorted, and at a definit velocity assume the parallelopiped form. At and above this "critical" velocity the relation between comp. and viscosity can be expressed by the relation $\eta_1 = \eta\ \bar{\varepsilon}f/(\bar{\varepsilon}f + 1)$, where η and η_1 are the viscosities of the emulsion and continuous phase, resp., and f is the ratio of the total vol. to that of the disperse phase. At very high conc. of the disperse phase this would however not hold, as the properties of the continuous phase change when in very thin lamellas. Below the critical velocity the relations are very complicated. D. A. MACINNES.

An Experimental Investigation on the Reflection of Light at Certain Metal-liquid Surfaces. LYNDE P. WHEELER. *Phil. Mag.*, **22**, 229–45; *Am. J. Sci.*, **32**, 85–100.—The refractive index of the surface of a liquid in contact with a metallic mirror is the same as that of the interior of the liquid—errors of observation being 0.005–0.015. Apparent exceptions are caused by thin films of foreign matter, *e. g.*, gas. Between liquids and gases there may be a transition layer. H. E. MERWIN.

The Transformation of Energy Accompanying Photochemical Processes in Gases. E. WARBURG. *Sitzungsber. Akad. Wiss. Berlin*, 1911, 746–54.—NH_3 was exposed to the action of a group of lines due to Zn, of λ between 203 and 214μ. The amt. of decomp. was detd.; from this the amt. of radiation transformed into chem. energy was calc.; the total radiation absorbed was detd. directly. In this case the "photochem. yield"—the proportion of the total radiation which is transformed into chem. energy—is only about 2%. J. JOHNSTON.

Second Spectrum of Hydrogen. II. C. PORLEZZA. Univ. Pisa. *Atti accad. Lincei*, **20**, II, 176–83; cf. *C. A.*, **5**, 3369.—Some 192 lines between $\lambda\lambda$ 6962.82 and 6032.14, 68 between 3889.16 and 3295.49, and 46 between 4807.49 and 4253.48 have been detd. All those of λ greater than 6563.05 (H_α), and many of the others, are new. The lines in the extreme red all have an intensity less than 1; in this respect qualitatively and in many respects quantitatively P.'s results differ from Croze's (*C. A.*, **5**, 3193). CHAS. A. ROUTLLER.

Absolute Light Measurement. A Suggestion for the Establishing of a Final Light Standard. R. A. HOUSTOUN. *Proc. Roy. Soc. London*, (*A*) **85**, 275–85; *Physik. Z.*, **12**, 800–6.—The luminous effect of radiation is, for different colors, not at all proportional to the intensity; hence it cannot be directly measured by a thermopile. Yet measurement by the eye is not satisfactory, as no 2 eyes are just alike. H. proposes to use an absorbing screen which transmits the different wave lengths in proportion to their ability to affect the eye, and then to measure this transmitted light by a thermopile. We thus have a definit and everywhere reproducible standard, which is also very close to the performance of the av. eye. Glasses and dyes he finds not sufficiently invariable as color standards, and turns to mineral salt solns. A suggested screen is 3 cms. of 0.4 *N* $CuSO_4$ soln., used together with 1 cm. of 0.005 *N* $K_2Cr_2O_7$. The resulting absorption yields a curve which differs from that of the normal eye no more than that varies with varying intensity of the light. W. P. WHITE.

The Nature of Light Action in Selenium. F. C. BROWN. *Physic. Rev.*, **33**, 1–26.—In order to account for the changes of resistance produced in metallic Se by light Röntgen rays, etc., B. assumes that 3 allotropic forms are present, that these are in dynamic equil. with one another; and further, that only 1 of these is a conductor. An

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exposure of Se to light affects the relative proportions in which the 3 forms are present and a new equil. establishes itself. The paper is largely theoretical in treatment and cannot be briefly abstracted. A. H. PFUND.

Effect of Light on the Electrical Conductivity of Selenium. O. A. VONWILLER. Univ. Sydney. *J. Proc. Roy. Soc. N. S. W.*, 43, 361–80.—The Se "cells" were made as follows: 2 Pt wires (diam. 0.004 cm.) were stretched on a sheet of mica at distances from 1–4 mm. apart. The space between the wires for a length of 2–3 cms. was filled with a thin layer of molten Se; the whole was cooled rapidly, heated to temps. varying from 170–210°, and then cooled again, after which the mica was cut away. By means of a special testing box the cells could be illuminated on either side or on both sides simultaneously. In this way it was found that on incidence of light the cond. of the Se nearest the surface is increased most; the effect, however, is not limited to an exceedingly thin surface layer, but may extend downwards several hundredths of 1 mm. The rate at which the effect falls off with the depth varies with the light used, being much greater with green than with red. The sensitiveness of the cells is much less for green than for red light. These observations indicate a greater absorption of green than of red light, as was shown by Pfund (*C. A.*, 3, 2266). J. JOHNSTON.

Effect of Light on Sulfur Insulation. F. W. BATES. Univ. Montreal. *Radium*, 8, 312–3.—Study of electroscopes using S insulation has shown that light causes S to conduct electricity feebly, the degree of cond. increasing with the light intensity. A. T. CAMERON.

Photoelectric Cells with Colored Cathodes. J. ELSTER AND H. GEITEL. *Physik. Z.*, 12, 609–14.—This paper defines the conditions which must be fulfilled in order that the remarkable photoelec. cells, discovered by the authors, shall show a constancy of behavior. The cells consist of a glass bulb containing a layer of alkali metal as one electrode and a Pt wire as the other. When H is present and a glow discharge is sent through the tube (the alkali metal forming the cathode) it is found that the metallic luster of the cathode disappears and the surface assumes a color which, in the case of K, Rb and Cs is indigo-blue and in the case of Na yellowish brown. These cells are not only very much more sensitive than before, but their spectral range of sensibility extends through the visible spectrum, even into the infra-red. If H is still present after the cells have been sensitized it is found that a process of self-evacuation goes on, accompanied by a disappearance of the sensitive surface, and a diminution of sensitiveness. In order to make a cell permanent the alkali surface is first sensitized in the presence of H, then the H is completely removed and some pure, inert gas, such as A or He, is introduced. Cells prepared in this manner have remained permanent, for more than 13 weeks. A. H. PFUND.

The Positive Potential of Metals in the Photoelectric Effect, and the Determination of the Wave-length Equivalent of Röntgen Rays. J. KUNZ. Univ. Ill. *Physic. Rev.*, 33, 208–14.—The photoelec. effect varies widely from one sample of metal to another, for reasons not yet well understood. Near the red end of the spectrum, with alkali metals, the potential produced has a max. for one frequency of the light, and also depends on the intensity of the light. Near the violet end it is mostly independent of intensity, and increases as the square of the frequency. It can thus be used to give the equiv. wave length, or thickness of pulse, of Röntgen rays. In the actual expt. the potential was calc. from the velocity of the electrons. With a tube whose hardness was equiv. to a 13 cm. spark, the velocity was 6.6×10^9, the equiv. wave length 1.6$\mu\mu$. W. P. WHITE.

Anomalous Dispersion of Light in Gases. W. H. JULIUS AND B. J. VAN DER PLAATS. *Proc. Akad. Wetenschappen*, 13, 1088–93 (English).—From a careful comparison of

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photographs of absorption spectra of a number of gases and vapors, including Cl, I and NO_2, it is concluded that selective absorption is always accompanied by anomalous dispersion. J. JOHNSTON.

Ionization of Gases by Light Emitted from Geissler Tubes. The Existence of Selective Effects in the Ionization. H. C. CANNEGIETER. *Proc. Akad. Wetenschappen*, 13, 1114–9 (English).—On the view that the production of ionization in gases by ultraviolet light is a resonance phenomenon, one would expect that the strongest ionization of a gas would occur when the origin of the light is a Geissler tube containing the same gas. To test this, expts. were made with H, O, N, CO and air, using special app., but no selective effects were observed. The ionization was found to vary with the pressure of the illuminated gas. J. JOHNSTON.

Investigation of the Effect of Neutral Gases on Absorption Lines by means of the Echelon. CHR. FÜCHTBAUER. *Physik. Z.*, 12, 722–5.—The author is enabled to use the echelon for his purpose by choosing as a source of light a Hg arc burning under pressure. The green line, under these conditions, is sufficiently wide to be crossed by several absorption bands and yet sufficiently narrow to avoid the overlapping of consecutive orders in the echelon. Changes in the absorption spectra of I, Br, Na and K are studied when neutral nonabsorbing gases are admitted. It is found that in general the neutral gas causes broadening as well as changes in the intensity of absorption lines. The effect on band and series lines appears to be different. A. H. PFUND.

Selective Reflection of Ortho-, Meta- and Pyro-phosphates in the Infra-red Spectrum. GRACE LANGFORD. Phoenix Phys. Lab., Columbia Univ. *Physic. Rev.*, 33, 137–51.—It has been definitly proved by the work of Pfund, Coblentz and Morse that the infra-red bands of selective reflection of salts derived from the same acid lie, very approx., in the same region of the spectrum. Although the mechanism producing these bands is localized in the acid radical, the base is of importance in so far as an increase in the at. wt. of the base causes a slight shift of the position of a band toward longer wave lengths. The object of the present investigation is to det. whether or not an exact relation between the valence of the base, or the chem. group to which it belongs, and the selective reflection characteristic of the salts of a given acid radical, may be formulated. By means of the usual radiometer-spectrometer the spectrum extending from 3μ to 21μ was investigated—the salts chosen being the ortho-, meta- and pyro-phosphates of Li, Ca, Zn, Pb, Ag, etc. In order to prepare reflecting surfaces from salts such as these, which are obtainable only in granular form, the salt was placed in a cylinder whose bottom was planed and highly polished. By means of a piston and an hydraulic press, the salt was subjected to a pressure of about 50,000 lbs. to the sq. in. and, as a result, was formed into a solid cylinder whose lower surface was highly polished. The results obtained show that the ortho-, meta-, and pyro-phosphates show bands whose position is characteristic and also, that P has a greater effect on the position of a band than S, even though the at. wt. of the 2 elements are nearly the same. The desired exact formulation of the various relations was not obtained. A. H. PFUND.

The Reliability of Results Obtained by means of an Exploring Electrode in the Cathode Dark Space. A. WEHNELT. *Ber. physik. Ges.*, 14, 505–10.—Heretofore the distribution of potential in a vacuum was carried out by means of an exploring electrode—it being tacitly assumed that the presence of this electrode caused no distortion of the elec. field. The author investigated this point by inserting an exploring electrode into the cathode dark space and then detg., by a method previously described (*Ber. phys. med. Ges. Erlang.*, 42, 94; cf. *C. A.*, 4, 2231), whether or not the electrode

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produces any distortion, *i. e.*, whether or not the electrode assumes the potential which existed at a given place previous to such insertion. It is found that the electrode assumes a positive potential which is too high, thus violently distorting the field and it is concluded that the method is faulty. Attention is called to the method of F. W. Aston (*C. A.*, 5, 1555) which avoids such complications. A. H. PFUND.

Determination of Charge of Silver Particles. E. WEISS. *Physik. Z.*, 12, 630–3.—The author makes use of Ehrenhaft's method of studying the motion of an ultramicroscopic Ag particle under the combined influence of gravitational and electric fields. The particles are obtained from an Ag arc. The particular feature of the method used lies in the ability to carry out many measurements (63 or more) on the same particle. The final result assigns to unit charge the value 4.5×10^{-10} E. S. U. Doubt is cast upon the permissibility of assuming the same d. for the small. particles as for Ag. Since the arc which produced the particles burned in air the possibility is suggested that the particles may be partly oxidized. Expts. to test this point are in progress. A. H. PFUND.

The Terminal Velocity of Fall of Small Spheres in Air at Reduced Pressure. L. W. MCKEEHAN. Univ. Minnesota. *Physic. Rev.*, 34, 153–72; *Physik. Z.*, 12, 707–22.—This velocity is given by Stokes' law in terms of the d. of gas and falling body, viscosity of the gas, and radius of the body. For very small spheres and low pressures the formula requires a modification, which has been given by Cunningham; his expression contains an arbitrary constant A, which depends on the way in which the mols. of gas behave after collision with the body. By expts. at different pressures the author finds that this constant is approx. 1, a value nearly 25% larger than that obtained by Millikan, using a different method. This value indicates that the mols., on collision, become tangled among the outer mols. of the body, and in general escape normal to its surface. W. P. WHITE

Note on the Production of Nuclei in Air by Intense Cooling. GWILYM OWEN. *Phil. Mag.*, 22, 563–6.—When dry, dust-free air was suddenly cooled to liquid air temps., invisible nuclei are formed, which when transferred to a Wilson expansion app. manifest their presence by their ability to collect H_2O and produce droplets. The author believes that these nuclei are aggregations of air mols. ROBT. F. EARHART.

The Electron Theory of Thermoelectricity. K. BAEDEKER. *Physik. Z.*, 11, 809–11 (1910).—The author makes use of the notion of the electrons ("thermions") given off from hot metals. These are supposed to exert some pressure even at low temps., and to obey the gas laws. By supposing that some of these electrons are carried reversibly around the circuit, a computation, carried out as it might be for a gas under similar treatment, yields equations satisfying the fundamental thermodynamic equations of thermoelectricity. This general view explains the thermoelec. effect of metallic solid solns. as due to the effect of the solute on the vapor tension of the electrons. W. P. WHITE.

Application of Thermodynamics to the Electron Theory of Thermoelectricity. F. KRÜGER. Dantzig. *Physik. Z.*, 11, 800–8 (1910); 12, 360–8.—This author also starts with the notion of an electron vapor pressure, but he adds "non-electric" heat effects due to the vaporization of the electrons, etc. He considers that the absence of such terms in Baedeker's formulas (preceding abstr.) leads to contradictions of experimental results. W. P. WHITE.

Electron Theory of Thermoelectricity. K. BAEDEKER. *Ann. Physik*, 35, 75–89.—A fuller presentation of the material treated in the article abstracted above. The Peltier and Thomson effects are expressed in terms solely of the electron pressure. The author considers that Krüger's criticisms do not apply to these expressions, and

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that the additional hypothetical terms may prove to be unnecessary. Some possibilities of experimental proof are considered. W. P. WHITE.

On the Electron Theory of Metallic Mix Crystals. A. L. BERNOULLI. Bonn. *Ann. Physik*, 35, 162–70.—A more elaborate presentation of the general point of view already given (*C. A.*, 5, 822, 2212). K. Baedeker (previous abstr.) is credited with priority in explaining the thermoelectric properties of alloys as due to electronic vapor tension effects. W. P. WHITE.

The Thermoelectric Effects (Thermoelectric Force, Thomson Heat) and the Conductivity in some Elements and Compounds, and the Experimental Verification of the Electron Theories. J. KOENIGSBERGER AND J. WEISS. Freiburg. *Ann. Physik*, 35, 1–46.—Graphite, Si, and compds. of Mo, Fe, S, etc., were used. Thomson heats were found in millionths of a small cal. per coulomb at about 50°; Si, —190 ± 10%; MoS, —27 ± 20%; graphite, —1 ± 70%; Fe_2O_3, negative, value uncertain. The following thermoelectric forces against Cu in microvolts per degree were observed: (as here given, the positive metal is the one positive at the cold junction) Si, +700 to 530; FeTi oxide, +140; FeS, +26; Fe_3O_4, —60; FeS_2, —200; Fe_2O_3, —500; Mo glance, —770. Except for FeS_2, the errors are not over 15%. The results are in most cases higher than those previously given by others. The e. m. f. per degree of Sn–constantan was found to increase suddenly by about 5 microvolts as the Sn melted. The thermal cond. of graphite is stated to be 4.7 times as great as that of Fe, or almost as good as Cu. From measurements of thermal cond. it appears that the ratio of this to the elect. cond., which is about 7 for many metals, is 8 for Fe, over 9 for Sb and Bi, 11 for constantan reaches 1180 for graphite, 68800 for Si, and 73000 for Fe_2O_3. Consideration of the Hall effect and of certain optical effects indicates, in contradiction to J. J. Thomson, that the number of electrons for most metals is less than the number of atoms. The thermoelectric powers of several substances seem to give inadmissible results for the number of electrons. The sign of the Thomson effect in many cases is also inconsistent with the usual forms of the electron theory. Modifications of the theory therefore seem needed. W. P. WHITE.

The Resistance between Metals and Crystals across Plane Surfaces. F. STREINTZ AND A. WELLIK. Graz. *Physik. Z.*, 12, 845–54.—The contact resistance between metal leads and crystals, such as sulfides, oxides, etc., can usually not be made negligible if solid pieces of metal are used, but varies with the current, the pressure, and the time. Leads of very soft metal (*e. g.*, amalgamated Au) are usually necessary; even then great care must be taken to see that the resistance is independent of current and pressure. This will probably always be the case if there is a considerable adhesion produced between metal and crystal. W. P. WHITE.

Passage of Electricity across Very Small Contact Distances. F. ROTHER. Leipzig. *Physik. Z.*, 12, 671–4.—Distances of 35–560 $\mu\mu$ were used and measured by an interferometer. For 1 v., currents of about 10^{-13} amps. were obtained, with a rather sharp increase for distances under 50 $\mu\mu$. The effects were identical in air and in a vacuum, but were extinguished by a very thin film of lubricating oil (volatilized when the vacuum was used) whence it appears that the conduction is due not to ionization, but to electrons from the metal, and that these are very slow-moving. W. P. WHITE.

The Volta Effect for Crystals. G. SZIVESSY. Techn. Hochsch., Stuttgart. *Ann. Physik*, 36, 183–6.—The plane face perpendicular to the principal axis of a crystal of hematite (which conducts electricity by metallic conduction) was polished perfectly smooth; 2 other faces were cut parallel to the principal axis, and perpendicular to each other. When glass tubes sealed to these faces were filled with an electrolyte, and the ends of a Pt or Zn strip dipped into any pair of tubes, the p. d. proved to be

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the same between any of the pairs of faces, within the limits of accuracy of the expts.
W. D. HARKINS.

Heterogeneous Solutions of Magnetic Salts in an Inhomogeneous Magnetic Field. C. STATESCU. *Compt. rend.*, 153, 547–9; cf. Voigt, *C. A.*, 5, 2464.—With solns. of the paramagnetic salts $FeCl_2$, $MnSO_4$, $NiSO_4$, $CoSO_4$, $CuSO_4$, the effect of an inhomogeneous magnetic field is to cause a redistribution, following the equipotential surfaces, of the salt in the soln., the conc. being greatest around the poles. J. JOHNSTON.

The Hall Effect in Cuprous Iodide Containing Iodine. KARL STEINBERG. Physik. Inst., Jena. *Ann. Physik*, 35, 1009–32.—Baedeker (*C. A.*, 3, 2266) found that CuI is a poor conductor of electricity, but when I is added the cond. varies from 0 to 93 reciprocal ohms. Steinberg deposited Cu on glass, changed this into CuI by I vapor, and hung the plate in either an I soln. or I vapor of known conc., and detd. the Hall effect in the CuI layer. He found that the transverse force is proportional to the primary current for current ds. from 0.15–23 amp./cm^2., and it is also proportional to the strength of the magnetic field up to 20,000 gauss. The coeff. of rotation, R, is positive and increases with increasing sp. resistance of the CuI, at first slowly, then more rapidly; finally the increase becomes proportional to the increase of resistance. Here $R = Ed/Hi$, where d is the thickness of the CuI; i, the primary current; E, the transverse e. m. f.; and H, the strength of the field. In the case of Bi, Ni, or Fe, the transverse and the longitudinal effects are of the same degree of magnitude, but, while the transverse effect is large for CuI, the longitudinal effect is extremely small. The proportionality between the magnitude of the effect and the primary current indicates that the transverse force is proportional to the velocity of the electrons.
W. D. HARKINS.

The Magnetization of Cobalt as a Function of the Temperature and the Determination of its Intrinsic Magnetic Field. W. W. STIFLER. *Physic. Rev.*, 33, 268–94.—The author has detd. the satn. value of the intensity of magnetization of Co at several temps. between 22° and 1150°. The Curie point has been established at 1075°. The curve giving the sp. intensity of magnetization, σ, as a function of the temp. is shown to be of the same general character as that demanded by theory, though differing from the theoretical curve by a const. amt. throughout most of its length. The values of the intrinsic molecular field, H_m, the moment of the elementary magnet, M, the no. of atoms in an elementary magnet, n, and the elementary charge, e, have been calc. and found to have the following values: $H_m = 8{,}870{,}000$; $M = 6.21 \times 10^{-20}$; $n = 4$; $\epsilon = 4.65 \times 10^{-10}$ E. S. J. L. CRENSHAW.

Magneto-optical Effects with Chlorine and Iodine. A. HEURUNG. Würzburg. *Ann. Physik*, 36, 153–76.—There is no appreciable change in the form of the curve representing the relation between the wave lengths in the spectrum of Cl or I vapor and the relative rotation of the plane of polarization caused by a longitudinal magnetic field as we pass through the region of absorption bands. When the I spectrum is observed through a Kirchhoff's app. with crossed Nicols, the spectrum was seen to be brighter in the green between the Hg lines $\lambda = 546$ and 491 $\mu\mu$ than it is when there is no magnetic field. This brightening cannot be made to entirely disappear by interposing a quarter wave plate nor by turning the analyzing Nicol. Somewhat similar results were obtained by the use of an Echelon grating. When the magnetic field was transverse the brightening appeared in the same region, but was much weaker. These phenomena appear to be due to the Zeeman effect. W. D. HARKINS.

Water in Plasma (FISCHER). 11.

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3. RADIOACTIVITY.

HERMAN SCHLUNDT.

Radioactivity and Electronics. V. F. HESS. Vienna. *Fortschritte Chem.*, 4, 233–54.—Review for the period Jan.–June, 1911. J. J.

The Radium Content of some Uranium Ores. W. MARCKWALD AND A. S. RUSSELL. *Chem. News*, 103, 277–8; see *C. A.*, 5, 3007. J. J. M.

The Number of Ions Produced by the Beta Rays and by the Gamma Rays from Radium C. A. S. EVE. McGill Univ. *Phil. Mag.*, 22, 551–62.—Expts. are described leading to the following results: The number of ions produced by the γ-rays per cc. per sec. at a distance of 1 cm. from a curie of Ra C (*i. e.*, the amt. of Ra C in equil. with 1 g. of Ra) in air at atm. pressure, is 3.74×10^9. The total number of ions per sec. produced by that quantity of Ra C at atm. pressure is 1.1×10^{15}. The corresponding figures for the β-rays are approx. 1.3×10^{11}, and 4.0×10^{14}. Hence the total number of ions made by one β-particle in an average flight from Ra C in the atmosphere is 1.2×10^4, equiv. to about 48 ions per cm. Hence, the β-particle must pass through about 180 mols. for every one which it ionizes, if the radius of the mol. is 10^{-8} cm. If the γ-ray is an entity with a linear path, the total ions per γ-ray are 3×10^4 for an average flight, and 1.2 ions per cm. of path. The heating effects of the β- and γ-rays have been calc. on the assumption that ionization is a measure of the energy expended, and if 1 g. Ra and its four succeeding products, have a heating effect of 110 calories per hr., the distribution is approx., α-rays 103.5, β-rays 2.0, γ-rays 4.5 calories. The energy expended in making an ion is calc. as 5.2×10^{-11} erg, and the radius of the mol. (as a minimum) 0.46×10^{-8} cm. A. T. CAMERON.

Production of Helium by Radium. B. B. BOLTWOOD AND E. RUTHERFORD. Phys. Lab., Univ. Manchester. *Phil. Mag.*, 22, 586–604.—The rate of production of He by a Ra salt (containing 0.193 g. Ra) was measured accurately, and found to be equal to 0.107 cu. mm. He per day per g. Ra (element), which is equiv. to 156 cu. mm. He per yr. per g. Ra in equil. with its first disintegration products, the Em., Ra A, and Ra C. This shows good agreement with the figure previously found by Dewar (*C. A.*, 3, 281, 616) working with only 0.07 g. Ra, and which, corrected to the authors' Ra standard is 164 cu. mm. The rate of production found is in excellent agreement with the figure 158 cu. mm. He per yr., calc. by Rutherford and Geiger (*C. A.*, 3, 21) from the results of their expts. on the number of α-particles emitted by Ra. The amt. of He formed in 21 days from the volume of Ra Em. in equil. with 0.126 g. Ra was measured and found to be 0.202 cu. mm. The theoretical amt. is 0.220 cu. mm., in fair agreement. The production of He from Po, and from a prep. containing radio-lead (and therefore Ra E, and Po) was observed. A. T. CAMERON.

The Relative Number of Ions Produced by the Beta Particles from the Various Radioactive Substances. H. GEIGER AND ALOIS F. KOVARIK. Phys. Lab., Univ. Manchester. *Phil. Mag.*, 22, 604–13.—The relative number of ions produced by the β-particles from the different radioactive products has been determined. In each case the number of atoms of the β-ray-substance breaking up was found from the number of α-particles emitted by an α-ray product in radioactive equilibrium with the β-ray-substance. The results can best be explained by assuming that Act. C, Th C, Ra B, and perhaps also Ra C emit two β-particles or consist of 2 successive β-ray products emitting similar types of rays. On the basis of this assumption the whole number of ions produced by a β-particle of high speed per cm. of its path at atmospheric pressure is 67. A. T. CAMERON.

The Ranges of the Alpha Particles from Various Radioactive Substances and a

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Relation between Range and Period of Transformation. H. GEIGER AND J. M. NUTTALL. Phys. Lab., Univ. Manchester. *Phil. Mag.*, 22, 613–21.—A table is given showing the ranges at 0° and at 15°, and the initial velocity of expulsion of the α-rays of U, Ionium, Ra, Po, Th, and Ra Th. When the logs. of the transformation constants of the elements of the U series are plotted against the logs. of corresponding ranges, the points lie very closely on a straight line. The same holds for the elements of the actinium series. Assuming that ionium is no exception, from the known range of its α-particle, inspection of the log. curve shows that its half value period should be nearly one million yrs. The relation shown offers a possible explanation of the reason why no substance has been found emitting α-rays of range shorter than 2.58 cm. The life of a substance emitting α-rays of range 1 cm. would be so long, and consequently its transformation so slow, that its activity would be beyond the limits of detection by present methods. A. T. CAMERON.

Transformation and Nomenclature of the Radioactive Emanations. E. RUTHERFORD AND H. GEIGER. Phys. Lab., Univ. Manchester. *Phil. Mag.*, 22, 621–9.—Recent papers of Geiger (*C. A.*, 5, 3196) and Geiger and Marsden (*C. A.*, 4, 862) show the existence of products of very quick transformation of both Act. and Th emanations, each of which emits α-particles. The time of transformation of these have been accurately detd. by Moseley and Fajans (see following abstr.). The presence of these newly found products can be simply illustrated in a dark room. Emanation from a strong prep. of Act. or Th is allowed to diffuse into a small cylindrical chamber containing an insulated metal rod, coated in part with ZnS. Without an elec. field the ZnS glows faintly from the α-rays of the emanation. When the metal rod is charged negatively by connecting it to a 1000 v. battery, the ZnS immediately lights brilliantly. On disconnecting, the illumination sinks instantly. The effects are due to the concentration of the short-lived product on the rod. There is a slow constant increase of luminosity due to the previously known products. The atoms are evidently positively charged, and behave as solid. The discovery of these products makes a change of nomenclature desirable. It is suggested that they be named resp. Act. A and Th A. The series become resp., so far as known: Radium series, Ra Em., period 3.86 days, α-rays (4.32 cm. range); Ra A, 3.0 min., α-rays (4.83 cm.); Ra B, 26.7 min., soft β-rays; Ra C = C_1 + C_2 [Ra C_1, 19.6 min., α-rays (7.06 cm.); Ra C_2, 1.38 min., β-rays]; Ra D soft β-rays. Thorium series, Th Em., 53 sec., α; Th A, 0.14 sec., α; Th B, 10.6 hours, soft β; Th C = C_1 + C_2 [C_1, 55 min., α (5.0 cm.); C_2, α (8.6 cm.)]; Th D, 3.1 min., hard β. Actinium series, Act. Em., 3.9 sec., α (5.7 cm.); Act. A, 0.002 sec., α (6.5 cm.); Act. B, 36 min., soft β; Act. C, 2.15 min., α (5.4 cm.); Act. D, 4.71 min., hard β. The numerous points of similarity between the series are evident. A. T. C.

Radioactive Products of Short Life. H. G. J. MOSELEY AND K. FAJANS. Phys. Lab., Univ. Manchester. *Phil. Mag.*, 22, 629–38.—The new products Act. A and Th A (see preceding abstr.) were studied by allowing a steady stream of air containing Act. or Th emanation to come in contact with a negatively charged disk rotating at high speed (*e. g.*, 160 meters per sec.). Their periods were deduced from the loss of activity of the disk during the time taken by it to pass from the one to the other of two similar ionization vessels, similarly situated with regard to the axis of rotation of the disk, and at a distance of 0.5 cm. from it. The results show that (1) Act. Em. is succeeded by a solid product, emitting α-particles, with a half-value period 0.0020 second. (2) Th Em. is succeeded by a similar product, half-value period 0.14 sec. (3) The product obtained by recoil from Act. active deposit is pure Act. D and the supposed complex nature of Act. C (cf. Blanquies, *C. A.*, 4, 412; 5, 241) is therefore not confirmed. A. T. CAMERON.

The Intensity of the Earth's Penetrating Radiation at Different Altitudes and a

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Secondary Radiation Excited by it. J. C. McLENNAN AND E. N. MACALLUM. Phys. Lab., Univ. Toronto. *Phil. Mag.*, 22, 639–46.—At Toronto the ionization obtained in air confined in a thin-walled 30 l. Zn receiver on the surface of the bare ground is greater than that obtained in the same air on the ice in Toronto Bay by about 5.8 ions per cc. per sec. (15.1, and 9.3 resp.). The same difference appears to exist at Livorno, Italy, and near Cape Town, S. Africa, between readings taken on the open sea, and on the neighboring land. Eve (*C. A.*, 5, 1365) and Simpson and Wright (*C. A.*, 5, 3195) have shown that the penetrating radiation over the ocean from Ra and Th in the sea is negligible; hence 5.8 ions per cc. per sec. represents the av. effect of the penetrating radiation emitted by the earth, and any rays of the β type which may accompany it. The Toronto observations give evidence of a radiation of the β type, accompanying the radiation from the soil and producing about 1.5 ions per cc. per sec. If Eve's value, 1.6 ions per cc. per sec., represents the direct effect of the penetrating radiation, the difference from 5.8, 2.7 ions per cc. per sec., must be produced by the secondary rays emitted by the walls of the Zn receiver, or by these and other radiations emitted by the soil and not yet detected. A. T. CAMERON.

The Variation of Ionizing Power with the Velocity of Cathode Rays. J. L. GLASSON. Cains Coll., Cambridge. *Phil. Mag.*, 22, 647–56.—The rate of variation with velocity is between an inverse first-power and an inverse second-power law, and is much nearer to the latter than to the former. One cathode ray moving with a velocity of 4.8×10^9 cm. per sec. makes 1.5 pairs of ions in traveling 1 cm. in air at a pressure of 1 mm. Hg. A. T. CAMERON.

The Mode of Conduction in Gases. J. S. TOWNSEND. Oxford. *Phil. Mag.*, 22, 656–7.—A criticism of Lodge's paper on the same subject (*C. A.*, 5, 3192). A reply by Lodge is subjoined (657–8). A. T. CAMERON.

Action of Cathode Rays on Minerals (DOELTER). 8.

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4. ELECTROCHEMISTRY.

C. G. FINK.

Tendencies in Power-plant Design. EDIT. *Elec. Rev. West. Elec.*, 59, 817. W. E. RUDER.

Progress in the Electro-metallurgy of Iron and Steel. DONALD F. CAMPBELL. *Chem. News*, 104, 192–4; cf. *C. A.*, 5, 429. E. G. C.

Heat Insulating Materials: The Relation between Surface Temperature and Efficiency. C. R. DARLING. *Engineering*, 92, 395–6.—When the surface of a given insulating material is treated so as to reduce its radiating power, the surface temp. is higher although the heat escaping is less. If 2 different materials possess identical surfaces, that which has the higher surface temp., under given conditions, is the worse insulator. Al paint, by decreasing the radiating power of the surface, increases the surface temp. but improves the insulating property of the material. C. N. MOORE.

Applications of Electric Heating. J. A. FLEMING. *J. Roy. Soc. Arts*, 49, 833, 857, 870, 886.—Popular review with list of books (cf. *C. A.*, 5, 2219). C. W. HILL.

An Unsuccessful Furnace Experiment. F. A. J. FITZGERALD. *Trans. Am. Electrochem. Soc.*, 20, 89.—The furnace described in *C. A.*, 5, 3198 was used. While the working of the furnace was most satisfactory the heat losses were excessive. These amounted to 28–51%. The great part of the loss was through the furnace walls. Attempts to reduce the losses failed. Detailed data are given. L. K. MULLER.

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The Present Position of Electric Steel Melting. A. McWILLIAM. Sec. B. British Assn. *Electrician*, **68**, 16.—The arc furnace product from slightly impure materials, purified to Swedish standard, just about takes its place by Swedish open-hearth and Bessemer steels, and the induction-furnace product skilfully made from pure materials equals anything but the very highest qualities of crucible steels. The special feature of the Héroult and Röchling-Rodenhauser types is that P and S can be eliminated to almost any extent. The Kjellin induction furnace has the advantage over the crucible in that there is no absorption of S during m. The loss in m. amts. to about 1-½% in the Kjellin, about 4-5% in the Röchling-Rodenhauser, and 7-8% in arc furnaces. Ni scrap can be melted without any loss of Ni. W. E. RUDER.

The Electric Refining of Steel. G. E. WALSH. *Elec. Rev. West. Elec.*, **59**, 230.—A review of the field of application is given. Von Odelstierna of Stockholm has shown that there is $1.55 per ton saved by the use of the elec. shaft furnace over the charcoal blast furnace in Sweden. W. E. RUDER.

Refining Steel from Bessemer Converters by a Composit Electrode Arc Process. FRANK C. PERKINS. *Chem. Eng.*, **14**, 406.—The novelty consists in the use of a new composit electrode for producing and refining steel in the elec. furnace. One type consists of a C tube with an Fe core and a mixt. of C, CaO, or Fe_2O_3 or other slag producing materials surrounding the same. Other types have the slag material packed in an Fe or steel tube or surrounding a C or Fe rod or rods, with and without projections for supporting the slag materials, using the usual binder employed in C electrodes, etc. By the use of composit electrodes a large part of the slag material is introduced in a highly fluid state at the hottest points of the furnace; the rest of it being added in the usual manner. The double pole elec. furnace is well adapted for this special electrode. The molten metal continually circulates; all parts of the bath come in contact with the refining slag at the arcs and are rapidly refined. Another advantageous feature is the control of the finished product, *e. g.*, in the addition of C and Mn and in the elimination of P. The cost is low. H. M. FERNBERGER.

Recent Progress in Electrical Iron Smelting in Sweden. T. D. ROBERTSON. *Trans. Am. Electrochem. Soc.*, **20**, 201.—The structure of the furnace described allows the use of 65% finely divided ores. No difficulty was experienced with titaniferous ores. Low-S iron could be produced from high-S ores. The characteristic feature of the pig Fe is its freedom from oxides while the quality of Fe produced for steel-making purposes has been shown to be equal and in some cases superior to the blast furnace pig Fe. G. F. YESSLER.

Electric Furnace Treatment of Nickel Ore and the Development of a Commercial Process. W. L. MORRISON. Case School. *Trans. Am. Electrochem. Soc.*, **20**, 312.—A process is developed for low grade Ni ores, av. about 1.75% oxide with large amts. of SiO_2 and Al_2O_3. CO reduction, C reduction with magnetic sepn. and wet methods failed. The elec. furnace used was similar to the Héroult furnace at Sault Ste. Marie. The records of runs show 9000 lbs. of ore treated per kw. yr. with 1,380 lbs. of silicide obtained. This silicide contains from 10-22% Ni. The output per day has been 800-1200 lbs. of silicide with an operating cost of $148.80. The concluding part of the paper is taken up with a discussion of various furnace designs and a proposed improved elec. smelter. W. E. RUDER.

Titanium-Vanadium Tool Steel Direct from Titaniferous Iron Ore. ANON. *Can. Mining J.*, **32**, 591-3.—The Canadian titaniferous Fe ore, ground and mixed with lime and charcoal, is preheated and fed into an elec. smelting furnace where it is completely reduced in a few hrs., yielding directly a high grade of Ti tool steel. The cost per lb. of steel seems to be considerably less than the present figure in existing large plants.

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It has been estd. that more than $^1/_3$ of the Fe ores of Ontario and Quebec are titaniferous. They cannot be used in the blast furnace, and hitherto have been considered useless. EDW. WOLESENSKY.

The Fixation of Atmospheric Nitrogen. I. J. W. BECKMAN. *Elec. Rev. West. Elec.*, 59, 533–98.—B. describes the various classes of fertilizers and their mode of manuf. H. M. FERNBERGER.

The Effect of Organic and Inorganic "Addition Agents" upon the Electrodeposition of Copper from Electrolytes Containing Arsenic. CHIN YU WEN AND E. F. KERN. Columbia Univ. *Trans. Am. Electrochem. Soc.*, 20, 152.—The combined addition agents of gelatin and NaCl, and of glue and NaCl, when present in small amts., are the most suitable addition agents for $CuSO_4$ electrolytes, especially such as contain a high proportion of As, as with these the deposited Cu possesses the greatest ductility and the highest purity. But the combined addition agent of say 0.01–0.02% gelatin and 0.01% Cl as NaCl seems to give smoother deposits than NaCl and glue. In the case of glue and inorganic compds., the use of $CuCl_2$, Cu_2Cl_2, or HCl is just as effective as NaCl; but for economic reasons NaCl is to be preferred. In discussion W. L. Spaulding points out that in some cases the addition of NaCl to Cu-refining solns. caused slimy layers on the anode. W. E. RUDER.

Bright Tin Coatings on Small Iron Articles. ANON. *Elektrochem. Z.*, 18, 177.—Cast Fe articles may be tinned by first heating in Fe_2O_3 or the like to remove the C from the outer skin. These are then pickled in dil. H_2SO_4 and dipped into the molten Sn where they are allowed to remain until they have reached the temp. of the bath. For obtaining very bright coatings the addition of 5–10% of Bi is recommended. W. E. RUDER.

Electroplating Artificial Stoneware. G. STRAHL. *Elektrochem. Z.*, 18, 173.—Various methods of preparing the surface for plating are given. W. E. RUDER.

Photography and Photomicrography of Electrolytic Metal Deposits. B. WÄSER AND R. KÜHNEL. *Elektrochem. Z.*, 18, 151.—Photomicrographs of Pb deposits from different electrolytes are given and a method recommended for exam. of all metal deposits. W. E. RUDER.

Sharpening Tools by Electrolytic Etching. E. SCHNECKENBERG. *Met. Chem. Eng.*, 9, 512–3.—Electrolytic etching, in which the tool forms the positive electrode for the etching soln. in contact with it, permits rapid etching on a definit spot, in a definit direction and strength, depending on the position and shape of the negative electrode. It is better to use an external battery as source of current instead of generating a current internally from a reaction between tool and C. As examples of practical applications of this method, file sharpening, needle-point sharpening, relief production and die sinking are mentioned. C. N. MOORE.

The Electrical Resistance of Iron Alloys. CHAS. F. BURGESS AND JAMES ASTON. *Trans. Am. Electrochem. Soc.*, 20, 241.—A detailed description of a series of tests on electrolytic Fe and its alloys, detg. their elec. resistance with tables showing ohms, per cm^3 and relative resistance of the alloys, forged and after treatment. The object was to find an alloy of high permeability and high elec. resistance. Additions of As, Si or Sn increase the permeability and the elec. resistance. Annealing usually results in a decrease of resistance. The resistance usually increases with increase in physical hardness. W. LLOYD VANKEUREN.

New Data on some Electrical Properties of Sodium, Potassium and their Alloy. E. F. NORTHRUP. *Trans. Am. Electrochem. Soc.*, 20, 123.—The method was as follows: Glass tube supplied with Pt terminals, was first filled with pure Hg, and the resistance detd. The same tube was then filled with Na or K or alloy in a molten state, and the

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resistance again measured at various temps. From the data so obtained the sp. resistance and temp. coeff. were detd.

Substance.	Spec. res. at 20° × 10⁻⁹.	Spec. res. at 100° × 10⁻⁹.	Temp. coeff. Low range.	Temp. coeff. High range.
Mercury.....	95810	103350	0.001003 (20° to 100°)	.....
Sodium.....	4875	9705	0.0053 (20° to 80°)	0.00494 (100° to 140°)
Potassium.....	7118	15275	0.0058 (20° to 50°)	0.00507 (66° to 120°)
Alloy, K Na.....	33800	37795	....	0.00147 (46° to 125°)

When the metal changed from the solid state to the liquid there was an abrupt change in its resistance. Na, in passing from the solid state at 93.5° to the liquid state at 96.3°, increased 44.8%. K, in passing from the solid state at 60.4° to the liquid state at 63.2°, increased 52.2%. The alloy of Na and K, in passing from 2.8°, at which temp. it may probably be considered as completely solid, to 20° at which temp. it may be considered as completely liquid, increased in resistance 48.5%. G. F. YESSLER.

Sodium as a Conductor. EDIT. *Elec. Rev. West. Elec.*, 59, 913.—Na would form a less expensive material than Cu for elec. conductors if its cost per lb. were less than 3 times that of Cu, because although its sp. resistance is 3 times as great, its sp. gr. is about 1/9 that of Cu. It has been proposed to enclose it in Fe tubes on d. c. circuits. C. N. MOORE.

Galvanizing Wire in Zinc Dust. ALFRED SANG. *Trans. Am. Electrochem. Soc.*, 20, 239; *Metal Ind.*, 1, 415–6.—Clean steel wire immersed in Zn dust heated to about 420° absorbs Zn from the moment the wire reaches the temp. of the Zn dust, a slow cementation taking place together with a slow sublimation of Zn at the surface. Above 420° galvanizing is instantaneous, but very little penetration of the Zn in the Fe is found. Wire heated to 800–900° in a non-oxidizing flame, and thrust into Zn dust takes on a considerable coat of much brighter appearance. The operation can be successfully carried on with a speed of 850 ft. per min. and uses 154 kw. hrs. per long ton of wire of any diameter. The deposition is brought about by the reduction of the little oxide coated globules of molten Zn known to exist when Zn dust is heated a little above its m. p. The rise of temp. with uniform heat is at a max. at 420° and at this point the best results are obtained. W. LLOYD VANKEUREN.

The Electrical Effect of the Vibration of a Metal in Contact with an Electrolyte. J. PIONCHON. *Compt. rend.*, 153, 47–9.—In a cell composed of either Zn or Cu electrodes in a soln. of the sulfate, an e. m. f. is generated by the vibration of 1 of the electrodes; or, if a difference of potential already exists, that of the + electrode can be increased by vibration or that of the — electrode diminished. This effect is generally observable with different combinations of metal-electrolyte but differs in extent and in direction. In a Daniell cell, in accordance with the above observations on the individual electrodes, vibration of the Cu increases the potential 0.0046 v., that of the Zn diminishes it 0.0190 v. G. R. FONDA.

Removing Oil from Condensed Steam by Electrolysis. H. BREDA. *Elektrochem. Z.*, 18, 157.—Steam always carries along a certain amt. of oil which forms an emulsion in the condenser water and which cannot be removed completely by previous methods. The Breda system uses a direct current electrolysis which causes the small particles of the emulsion to collect quickly at the top where they are drained off. Only 0.15–0.2 kw. per 1 cu. m. H_2O is required, costing about 0.24 cts. A very slight amt.

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of unfiltered H_2O is mixed in to make the H_2O to be treated to lower the resistance. Fe plates are used for electrodes and the current is reversed occasionally to prevent the oil from collecting too much on one electrode. Illustrations are given. Running through a sand filter finishes the process and gives perfectly clear and pure water.

W. E. RUDER.

An Incandescent Lamp of High Efficiency. M. DUSSAND. *Compt. rend.*, **152**, 1849.—D. has designed a lamp having a W filament wound in the form of a solenoid so as to occupy a space of 30 cu. mm. which on a normal voltage of 16 v. consumes 1.3 amps. He considers it particularly valuable as a substitute for the arc in optical app. because of the conc. of the illumination and the absence of heat. His remarkable claims for its efficiency are not substantiated by photometric data. G. R. FONDA.

The Radiant Efficiency of Arc Lamps. HENRY P. GAGE. Cornell Univ. *Physic. Rev.*, **33**, 111–27.—A detn. of the radiant efficiency and the mechanical equiv. of the light from the right-angle C arc and the Bremer flaming arcs. Luminosity curves show that 0.68 μ is preferable as a limit of the visible spectrum to the A line, 0.76 μ; if all radiation of greater wave length than 0.68 μ be removed, the resulting decrease in light is negligible. The measurement was made with a radiomicrometer, using the kick or ballistic method, and a modification of the method of Angström. The greatest efficiency was found in the arc stream between yellow flame carbons, the C tips being shaded; in this case the light energy constituted 39% of the energy radiated. The highest efficiency from black body radiation is from the positive crater of the C arc; this gives an efficiency of 8–12%. The radiant efficiencies found are: C arc, 7.5 amp., 7.9%; 10 amp., 9.3%: + crater, 15 amp., 11.6%; 20 amp. 12.3%: — crater, 3.3% a. c., shaded, 15 amp., 7.2%; 20 amp., 8.5%: entire, 6.3%: arc stream, 21%. Flame arcs: entire arc, yellow, 15.4%; white 14.6%: arc stream, yellow 39%; white 27.5%. Nernst, through $CuSO_4$, 100%. Hefner (Angström) 0.363%. Calculations of the mechanical equivalent of light showed that 1 w. can produce as high as 30 c. p. of white light and 39 c. p. of orange light. The data of Angström, recalc. for the limit 0.68 μ, gives 21.3 c. p. per w.

R. W. MOORE.

Radiation form Mercury Vapor Lamps. CH. FABRY AND H. BUISSON. *Compt. rend.*, **153**, 93–5.—The authors confirm results on the variations in the radiation of different wave lengths with increased w. consumption and the differences in the amt. of ultraviolet radiation exhibited by lamps of different makes. They failed to find evidence that the relative amt. of ultraviolet radiation decreases with life.

G. R. FONDA.

Electrical Experiments with Mercury Contained in Tubes. J. H. VINCENT. *Phil. Mag.*, **22**, 506–33.—A Hg arc was produced in quartz tubes of various lengths. The character of the discharge was studied by means of a revolving mirror. Minute phenomena which accompany change in resistance induction, and potential are described. The various effects dealt with are: (1) Persistent illumination in which a Hg arc increases and decreases in length rhythmically. (2) Periodic illumination in which the arc is intermittent. (3) Persistent illumination in which the arc is of const. length. (4) The emission of a faint, bluish green light from a space containing liquid Hg and its vapor. (5) Phosphorescence of fused quartz.

ROBT. F. EARHART.

Ultraviolet Radiation from Quartz Mercury Vapor Lamps. VICTOR HENRI. *Compt. rend.*, **153**, 265–7.—After showing that the speed of photochem. reactions is accelerated by exposure to Hg lamps, H. gives data on the speed of sterilization and of the action on Ag citrate paper. Both increase proportionally to the voltage of the lamp. The speed of sterilization can therefore be used to det. the yield of ultraviolet

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rays. As the temp. of the lamp is raised, the ultraviolet radiation increases more rapidly than the total radiation. G. R. FONDA.

Modifying the Color of the Mercury Vapor Lamp. J. ESCARD. *Lumière elec.*, 15, 236.—A brief history is given. Hg arcs in a vacuum contain several rays which may be easily absorbed by a number of common materials. As a result of the lack of red rays in the spectrum in the Hg arc objects assume an unnatural color in this light. The Hg-vapor lamp also has no red rays, but it does not fatigue the eyes and it has a good influence physiologically and psychologically; its flame is absolutely stable. The ultraviolet rays of the Hg lamps have a negligible effect on organisms as compared with X-rays. To make the rays more like sunlight various methods have been used. Glass of various shades of red and cloth screens dyed with aniline colors are good but reduce the luminous efficiency 25–30%. The Hopfelt lamp combines the C filament and Hg light by running the hot filament in an inert gas and Hg vapor. A sp. consumption of 1.65–2 w. p. c. is claimed for this lamp and a very satisfactory color is obtained. Metal filaments with various coatings are used. Ba, Ca, and Zr alloys of Pt, Ta, W, etc., give excellent results. The Hahn, Bastian and Fish methods all combine the rays from the Hg lamp and an independent incandescent, either in series or in multiple, by reflection of the rays. The Vogel lamp combines the C arc with the Hg arc and give a very good light. Arcs 150 mm. long and 75 mm. in diam. are obtained and a 2200 c. p. lamp has an efficiency of 0.27 w. p. c. Impregnating salts are used to vary the color. Amalgams of various kinds are used. The feature limiting the use of Na or K amalgams, as in the Weintraub lamp, is their action upon the glass. A 14% Cd amalgam gives good results. Zn amalgams (30%) give excellent light, resembling sunlight in a marked degree. Complex amalgams and a number of gases as N, A, He, and Ne are also used. W. E. RUDER.

Experiments on a Mercury Arc Converter. J. W. ELLIOTT AND C. S. PARSONS. *Electrician*, 67, 534–8.—Photographs are given, obtained stroboscopically, showing the changes over of the arc from one pole to the other. An overlap of the arcs of $11\frac{1}{2}$ and 70 elec. degrees is shown at the 2 points in each complete cycle at which the arcs change over. Oscillograph records of the wave form of the current from the alternator showed a want of symmetry which would account for unequal distortion in each of the anode circuits, thus producing an overlap of the arcs. C. N. MOORE.

Visual Acuity and Light of Different Colors. J. S. DOW. *Elec. World*, 58, 955.—As regards the best qualities of light for distinct vision, the violet end of the spectrum would seem to be best for very near work, the central region for moderate distances, and the red end for distant objects. The desirability of absolutely monochromatic light is commented upon. W. LLOYD VANKEUREN.

Candle-power Life Performance of Incandescent Lamps. G. S. MERRILL. *Elec. World*, 58, 1144–5.—The use of mean horizontal candle-power as indicating lamp performance has led to considerable error in judging the true performance of metal-filament lamps. The effect of service is to darken the bulb in these lamps in a distinct band about the horizontal projection of the filament, thus reducing the mean horizontal more than the mean spherical candle power. In the case of C-filament lamps, the blackening is distributed much more uniformly over the entire bulb so that the total light flux varies approx. as the mean horizontal candle-power. C. N. MOORE.

Radiation Characteristics of Incandescent Lamps. J. RUSSNER. *Elektrotechn. Z.*, 32, 1026–7.—In C and in metal filament lamps only 1.6 and 4.5% resp. of the elec. energy is transformed into light. These results were obtained by measuring the rise in temp. of a 30% soln. of ferroammonium sulfate 33 mm. thick, 1st, with a lamp alone burning in it, and 2nd, with a lamp enclosed in tinfoil coated on one side with lamp-

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black. The Fe soln. alone absorbs almost all of the heat waves but only 15% of the light waves whereas the lampblack absorbs all of both. C. N. MOORE.

The Cost of Energy Necessary to Produce the Unit of Luminous Intensity. H. BUISSON AND CH. FABRY. *Compt. rend.*, 153, 254.—The violet, green, and yellow rays from a quartz Hg vapor lamp were isolated and compared photometrically with the light from a Hefner standard. The Hg lamp measured 6 cm. in length and operated at 27 v. with a current of 3.5 amps. The c. p. in a direction normal to the length of the tube was 2.1 for the violet ray, 41.5 for the green and 17 for the 2 yellow rays. The power in w. per sq. cm. was measured at a distance of 1 m. from the lamp. The w. per mean spherical c. p. were accordingly 0.31 for the violet ray, 0.018 for the green and 0.021 for the yellow. G. R. FONDA.

High Voltage Corona in Air. J. B. WHITEHEAD. *Proc. Am. Phil. Soc.*, 50, 374–96.—The arrangement used consists of a metal cylinder along whose axis the wire to be tested is stretched and the terminals of the secondary of a high potential transformer are connected, resp. to the cylinder and wire. A continuous blast of air is passed through the cylinder and then through a wire mesh which is connected to a charged electroscope. Since the corona is due to a copious supply of ions produced by the intense elec. field, the faintest beginning of a corona may be detected by a sudden and rapid leak of the electroscope which is discharged by the ions carried to the wire mesh. The "critical" voltage at which the air around the wire is ionized may be detd. very accurately and results obtained at various times are most consistent. A summary of the results obtained follows: I. *Influence of Diameter of Conductor.*—If E be the "critical" electrical intensity in kilovolts per cm., and d the diameter of the conductor in cm., then, as has been shown by Alexander Russel, the results may be expressed very accurately by the relation $E = 32 + 1.34/\sqrt{d}$. II. *Effect of Stranding the Conductor.*—If instead of a single conductor a stranded conductor of equivalent cross section be used, E will be lowered, but by less than 3%, if the no. of strands is greater than 5. III. *Frequency.*—Within the range of com. frequencies 25–60 cycles per sec. the variation in E is but 2%. The abs. value of E is highest at the lowest frequencies. IV. *Influence of Pressure.*—An increase of pressure of the gas surrounding the wire produces increase in E. The linear relation is given by the expression $dE/dr = 6.15 + 0.744p$ where p is the pressure in cm. Hg. The slope of the curve, while constant for a given wire, increases with decreasing diam. of wire. V. *Influence of Temp. and Moisture.*—Tests carried out between 6–41° showed that E decreases linearly with an increase of temp.—the change amounting to 0.22% for 1°. Moisture is without effect. A. H. PFUND.

Corona Losses. H. GOERGES, P. WEIDIG AND A. JAENSCH. *Elektrotechn. Z.*, 32, 1071.—A theoretical paper. C. G. F.

Annual Exhibition of the Société française de physique (SCHEUER, SAPHORES). 1. Zinc Coating of Pipes (KRÖHNKE). 14. Rapid Electroanalysis (FISCHER). 7. Metallic Cerium (HIRSCH). 6.

U. S., 1,005,240, Oct. 10. E. O. LEGGETT, Niagara Falls, N. Y. **Composition for insulating electric wires**, consisting of lac seed 9 oz., gamboge 24 oz., red gum 6 oz., asphaltum 3 lbs., Venice turpentine 3 pints, H_2SO_4 2 fl. oz., alc. 1 pt. and sufficient turpentine to make 3 gals. of the mixt.

U. S., 1,005,628, Oct. 10. H. W. FISHER, Pittsburgh, Pa. **Uniting different metals** by electroplating one metal, *e. g.*, Cu, upon another, *e. g.*, Fe, from an electrolyte, *e. g.*, borax and $CuCl_2$, maintained at a temp. as high as the m. p. of the metal so-de-

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posited, submerging the electroplated surface of the article in a bath of flux and displacing the flux with a body of molten metal. In making wire, the interior of a metallic tube is thus filled with another metal and the blank thus formed then reduced.

U. S., 1,005,629, Oct. 10. *Idem.* Coating iron with copper by electroplating Fe with Cu at a temp. as high as the m. p. of Cu, and then electroplating a further deposit of Cu upon the Cu-coated body at substantially atm. temp.

U. S., 1,005,671, Oct. 10. W. B. THORPE, Balham, London, England. Electrolytic device for use in meters, comprizing a tube with an electrolytic cell at one end, a movable piston subject to the pressure of the evolved gases and formed by a column of Hg and annular pieces of metal forming a fluid-tight joint between the Hg and the inner surface of the tube, a negative contact extending into the Hg, and a capillary bore filled with a fine thread or column of the electrolyte extending between the cell and the Hg.

U. S., 1,005,672, Oct. 10. *Idem.* Electrolytic apparatus for use in meters, comprizing an electrolytic cell closed gas-tight at the top and open at the bottom and terminals one of which is arranged to normally dip into the electrolyte but to form a spark gap therewith on depression of the electrolyte below the terminal and the other of which is in permanent connection with the electrolyte.

U. S., 1,005,718, Oct. 10. F. M. KÖHLER, St. Petersburg, Russia. Electrolytic cells arranged in series for refining metals, each cell comprizing anode plates consisting of the metal to be refined and sepd. by a frame forming with the anode a container for the electrolyte, the frame having a transparent side, a cathode in each container, pipes for supply and discharge of the electrolyte so arranged as to exclude air from the containers, and connections between the anode plates of one container and the cathode plates of the adjacent container.

U. S., 1,005,725, Oct. 10. G. MASSIP, Paris, France. Electric furnace, comprizing a hearth whose entire inner surface is made of refractory material, *e. g.*, MgO, which is a non-conductor of elec. when cold, heating resistances embedded within the hearth and away from its inner surface, an elec. circuit for heating these resistances and changing the hearth from a non-conductor to a conductor, a movable electrode within the furnace, and a main elec. circuit one terminal of which is connected to the movable electrode and the other terminal to the hearth, both circuits being inductively energized through a converter.

U. S., 1,006,021, Oct. 17. C. P. STEINMETZ, Schenectady, N. Y. Modifying the color of an arc light and protecting the inclosure in which it is contained by introducing a vaprous color-modifying substance, *e. g.*, NaI, KI and LiI, to the arc and maintaining it in an ionized state by the addition of a protecting substance, such as free I, the action of the color-modifying substance being increased by the use of an excess of the protecting substance.

U. S., 1,006,330, Oct. 17. J. R. WILLIAMS, H. W. BRADLEY and B. BRADLEY, Sheffield, England. Extracting zinc or copper from ores by leaching with a soln. of sulfate of one or both metals containing a small % of H_2SO_4 and electrolyzing the liquor to remove enough metal to regenerate the soln. and then employing the soln. for further leaching.

U. S., 1,006,389, Oct. 17. C. LUCKOW, Cologne, Ger. Electrolytic manufacture of white lead, using anodes of soft Pb and cathodes of Pb with depolarizing fillings of Pb oxide, a number of the cathodes forming boxes serving as "filtering cathodes" and all the cathodes being preferably inclosed with wooden frames and filtering cloths, an electrolyte containing 1–2% alkali chlorate in mixt. with an alkali carbonate, passing a current through the soln., the carbonate and H_2O being always added to the

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electrolyte as they are consumed and the lye developed from the electrolyte and entering the "filtering cathodes" being extracted therefrom.

U. S., 1,006,494, Oct. 24. WM. MORRISON, Chicago, Ill. **Bromine gravity electric battery** with a negative element comprizing pockets with a porous filling, *e. g.*, granular C, containing free Br.

U. S., 1,006,612, Oct. 24. E. WEINTRAUB, Lynn, Mass. **Electrolytic meter,** comprizing a vessel for the electrolyte, a container for a Hg anode depending from the upper part of the vessel, a graduated tube for holding Hg connected at one end to the container, and a compressible bulb at the other end of the tube for forcing Hg into the container.

U. S., 1,006,620, Oct. 24. A. APPELBERG, Schenectady, N. Y. Assignor to Gen. Elec. Co. **Electric furnace,** comprizing a tubular W heater and connections for circulating H about the W heater while material is being introduced into the furnace at its normal running temp.

U. S., 1,006,697, Oct. 24. K. R. SMITH, Totnes, Eng. **Acid-proof, electric-battery terminal** consisting of a Pb post, a celluloid tube screwed on the end of the post and projecting above the latter and a celluloid plug screwed into the projecting portion and carrying the conducting wire through its axis.

U. S., 1,006,774, Oct. 24. WM. MORRISON, Des Moines, Iowa. **Making negative electrodes or positive pole plates** by mixing material to become active, *e. g.*, PbO and Pb_3O_4, with a soln. of $(NH_4)_2SO_4$ and H_2O_2, applying the paste so formed to a support or grid, permitting it to dry and then dipping it successively into H_2O_2 soln. and a soln. of dil. H_2SO_4 and H_2O_2, the plate being permitted to dry after each dipping.

U. S., 1,006,836, Oct. 24. F. F. FARNHAM, McKeesport, Pa. **Treating solutions of iron sulfate,** by subjection to an elec. current passing from an anode through a diaphragm to a cathode to deposit Fe on the latter and form H_2SO_4 at the anode, passing the soln. through the diaphragm and perforations in the anode and then drawing it off.

U. S., 1,006,876, Oct. 24. A. L. J. QUENEAU, Overbrook, Pa. **Reducing zinc ores and compounds** by establishing within a reducing chamber a fluid resister, introducing into the chamber the Zn ore charge, its reducing constituent not being materially in excess of that required for the reduction, maintaining the temp. of the charge at the reducing point by passing an elec. current through the resister, and tumbling the contents of the chamber in the presence of a highly liquid slag.

U. S., 1,006,877, Oct. 24. *Idem.* **Electric furnace for the metallurgy of zinc,** etc.; see *C. A.*, 5, 2621.

U. S., 1,007,388, Oct. 31. A. S. RAMAGE, Buffalo, N. Y. **Cyclical method of refining iron by electrolysis** by electrolyzing a soln. of a ferrous salt in a cell provided with a diaphragm and insol. anodes, reacting on the anode with SO_2 without effecting its complete reduction, neutralizing the anode liquor and reducing the ferric salt in it with impure Fe, combining the resulting ferrous soln. with the effluent cathode liquor, and returning the combined liquors to the electrolytic cell.

U. S., 1,007,441, Oct. 31. W. S. HADAWAY, JR., East Orange, N. J. **Making an electric heater** by soaking asbestos sheets with japan, baking the sheets, recoating them with japan, assembling a resistance element between the sheets before the japan is dry, applying a covering of sheet metal the inner surface of which is first coated with japan, pressing all the parts together and coating the whole with japan.

U. S., 1,007,516, Oct. 31. J. W. BECKMAN, Niagara Falls, Canada. **Making a porous contact mass for use in obtaining nitrogen from the air,** by heating a mixt.

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of finely powdered SiO_2 and Cu oxide and granular Al_2O_3 above the m. p. of Cu to permit the SiO_2 to react with a portion of the Cu oxide and to cause the excess of the latter to coat the particles of Al_2O_3.

Ger., 229,171, Sept. 29, 1909. O. FRICK, Sheffield, Eng. **Electric reduction of ores.** The fusing chamber has such a form that the ore falling down through the shaft has one or more free surfaces in the fusing chamber. The crushed coal is fed around the electrodes in such manner that it spreads over the mentioned free surfaces of the ore and wholly or partly transmits the current of the electrodes to the ore.

Ger., 228,889, Nov. 5, 1907. P. SCHMELZER, Metz. **Electric furnace,** provided with a large crucible and with flaming or lighting arc heating. In the lower part of the crucible are let in, at opposit points of the furnace walls, electrode plates taking up nearly the width of the fusion chamber so that also the parts of the material to be fused, removed from the surface, are equally heated, as the current must flow through the lower part of the material.

Ger., 229,085, Aug. 8, 1908. KALIWERKE ASCHERSLEBEN U. DR. L. HERMANN, Aschersleben. **In a connection for electrodes,** the electrode is sepd. from the metallic conduit by an interposed non-porous piece, the latter being produced from a pressed mixt. of finely divided C or graphite and metal powder, whereby the formation of a cohering metal chloride crust upon the interposed piece is avoided.

Ger., 229,302, March 27, 1902. A. HEFFENSTEIN, Wien. **Electric furnace with** charging reservoir built above the charge shaft. On the ceiling of the furnace, laterally from the narrower charging shaft, openings capable of being closed are arranged in order to be able to observe and control the process in the furnace during continuous operation.

Ger., 229,407, March 3, 1909. POLDIHÜTTE TIEGELGUSSTAHLFABRIK. **Heat- and fire-proof insulation for electric induction furnaces.** The part in direct contact with the metal bath of the insulation is produced by stamping or pressing fire-proof material so that the thickness of the wall of this insulation is everywhere nearly equal. At the same time one or more buffers are arranged so that an undisturbed expansion of this entire part of the fire-proof lining can take place. The inner wall of the induction fusion channel is not as steep as the outer wall. Laterally from the part of the fire-proof lining coming in contact with the liquid metal loose fire-proof stones are arranged and embedded in sand or ground fire-proof material. The inner wall of the lining is cooled by a jacket.

5. PHOTOGRAPHY.

LOUIS DERR.

Polychromatic Silver. H. LÜPPO-CRAMER. *Phot. Korr.*, 58, 403–9.—To 5% Ag sol., prepared by Carey Lea's dextrin method, an equal quantity of 5% thoroughly washed gelatin is added, then twice as much 20% KCNS. The soln. is at first red and then a brilliant green. Dry plates have been prepared with this after removal of the KCNS by dialysis, though the green usually disappears in the process. L. DERR.

Reaction of Hydrogen Peroxide in Producing Relief. H. LÜPPO-CRAMER. *Phot. Korr.*, 58, 466–71.—Twenty cc. of 3% H_2O_2, acidified with 1 cc. of 50% H_2SO_4, acts very slowly on a negative, but the addition of 2–3 drops of 10% KBr in a few minutes causes a marked softening of the parts containing the Ag of the image, so that the gelatin may easily be rubbed away with the Ag in it, leaving the clear regions unchanged. The metallic Ag acts as a catalyzer. L. DERR.

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Theory of Latent Image. W. H. IDZERDA. *Phot. Korr.*, 58, 505–8.—With Ag halides the exciting energy forms "introductors," which may be intermediate products, resonators, or catalyzers. They lead to continuing action of the same or different kinds of energy, and the action may be (1) oxidation, reduction of size of nucleus of the disperse phase, regression, regeneration (solarization), or (2) reduction, enlargement of nucleus of the disperse phase or progression (Becquerel effect). L. DERR.

Colloid-chemical and Catalytic Theories of Persulfate Reduction. H. LÜPPO-CRAMER. *Phot. Korr.*, 58, 495–502.—An argument in favor of the former, which depends on the fact that the Ag aggregates of an ordinary photographic negative differ in the lights and the shadows of the image, having a greater relative surface in the latter. L. DERR.

Change of Form of Silver Bromide Grain in Development. H. LÜPPO-CRAMER. *Phot. Korr.*, 58, 547–52.—Four photomicrographs are given, indicating that the great difference in shape between developed Ag grains and the original AgBr may be merely an effect of the developing process, since the grains produced by development without previous exposure to light are similar to the ordinary ones. Hence each AgBr grain must be regarded as a system in itself, and the theory of original and subsidiary nuclei fails of confirmation. L. DERR.

Gelatin Content of Nuclei in Silver Halide Emulsions. H. LÜPPO-CRAMER. *Phot. Korr.*, 58, 355–9.—It appears definitly proved that the crystallin nuclei contain a minute quantity of gelatin, and that this increases the sensitiveness. The increase of sensitiveness by ripening, usually ascribed to the deposition of traces of Ag on the nuclei by the ripening process, must therefore be in part due to the effect of this included gelatin. L. DERR.

History of the Bleach-out Process. F. LIMMER. *Phot. Korr.*, 58, 307–11.—Deals with priority claims of Neuhauss and Worel. L. D.

Crystallized Photohalides. H. LÜPPO-CRAMER. *Phot. Korr.*, 58, 311–2.—A satd. soln. of AgCl in NH_4OH containing a little gelatin is treated with colloidal Ag in the dark. Four photomicrographs are given. L. DERR.

Carey Lea's Hypophosphite Reaction. H. LÜPPO-CRAMER. *Phot. Korr.*, 58, 312–4.—Inability to confirm the observations of Lea, Bancroft and Perley that Na_3PO_2 will produce a developable image on the photographic plate leads to the conclusion that the salt used by these workers contained hypo, for no effect was produced with the pure salt. L. DERR.

Colors of Silver in Silver Bromide. H. LÜPPO-CRAMER. *Phot. Korr.*, 58, 352–5.—A fine-grained plate is bathed in 2% $AgNO_3$ and dried. Exposed to sunlight 1–2 hrs. under a scale of graduated opacity and then fixed in hypo, the plate shows brilliant colors ranging from yellow to orange, red and blue. The yellow disappears on drying. L. DERR.

Color-adaptation of Photo-halides. H. LÜPPO-CRAMER. *Phot. Korr.*, 58, 270–5.—The spectrum rays falling upon Ag halide surfaces produce approximately corresponding colors except for yellow. With photohalides, the production of blue requires the original Ag nuclei to be above a certain minimum size. The already-known bleaching effect of red light on surfaces darkened by previous exposure to blue is ascribable to the disintegrating action of the light, with consequent reduction of the size of the particles and hence a change in their color. L. DERR.

Rational Development in Two Compensating Baths. A. CALVET. *Bull. soc. franç. phot.*, [3] 2, 329–44.—Two baths are needed: (A) for soft effects consists of 1000 cc. water, anhydrous Na_2SO_3 40 g., diaminophenol 2 g., 10% KBr 5 cc.; (B), for

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contrasts, is 1000 cc. water, sulfite 15 g., diaminophenol 6 g., KBr 70 cc. The plate is immersed in A until development fog is just visible, then transferred to B until the desired density is obtained. This procedure requires a minimum of judgment and gives the best results up to the limit of exposure errors which can be corrected by development. L. DERR.

Tinted Photographic Printing Papers. K. KIESER. *Brit. J. Phot.*, 58, 474.—The paper support for the emulsion may be tinted by the following: Alizarin saphirol for soft blue tones, naphthol green B for soft green, chloroamine brown G for brownish, papierecht-bordeau B for purplish, brilliant crocein 3 B for yellowish red, echt-lichtgelb 3 G for yellow; the last 2 in conc. soln. give a fiery red. L. DERR.

A New Silver Intensifier. J. B. B. WELLINGTON. *Brit. J. Phot.*, 58, 551–2.—The plate is soaked 5 min. in 10% formalin and bleached in K_4FeCy_6 2 parts, KBr2, water 960 and then rinsed. KCNS 1 part, hypo 1, water 7 are mixed and an equal quantity of 8% $AgNO_3$ added while stirring. To 8 parts of this mixture 1 part of pyro with Na_2SO_3 and 2 parts 10% NH_4OH are added, and the final solution poured over the plate. Ag is deposited on the image, and when the intensification has gone far enough a hypo bath and a wash complete the process. The result is free from stain and is permanent. L. DERR.

Fogging Power of Developers. C. E. K. MEES AND C. W. PIPER. *Brit. J. Phot.*, 58, 491–4, 515–6, 535–6.—In developing an exposed plate, the rate at which density grows is expressed by the term "velocity constant," and the rate of growth of fog on unexposed areas is expressed by a similar constant, the ratio between the 2 being known as the fogging power of the developer. With a simple hydroquinone-NaOH developer the fogging power is practically constant for any proportion of alkali. With 0.1 *N* NaOH, the fog diminished rapidly as the hydroquinone conc. increased, leading to a promising developer formula of extreme simplicity: 5% hydroquinone + 0.5% NaOH. With Na_2SO_3, the fog velocity reaches a maximum and constant value at about 0.05 *N*, while the development velocity is unaffected. When KBr is added, fog is prevented in the early stages of development, but after about 5 min. the fog curve rapidly rizes. Fog is produced by atmospheric oxidation and in the absence of air will occur if the developer is not agitated, whence it appears possible that it may be caused by the oxidation product resulting from reduction of the Ag, which is a more powerful reducer than the developer itself. Dichroic fogs present analogies to the gray sulfite fogs, the differences between them seeming to be due to the time interval between solution and reduction; if this is great the AgBr diffuses through the film as a finely-divided, colored product, but if reduction follows solution at once the Ag is deposited coarse-grained and black. L. DERR.

Colors of Photo-halides. H. LÜPPO-CRAMER. *Phot. Korr.*, 48, 33–7.—If a very small quantity of colloidal Ag is poured over a clear AgBr gel, in a few min. the color changes from yellow to rose-red, and this color in 15–20 min. becomes "fast" enough to resist HCl. Further change from red to violet and blue depends on various conditions, which are indirectly referable to enlargement of Ag particles. The AgBr gel is a kind of sponge, whose pores have sub-microscopic size. L. DERR.

Hardening of Gelatin in Solarization. A. P. H. TRIVELLI. *Phot. Korr.*, 58, 29–33, 182–4.—The disputed question of the existence of this effect is discussed by the author, who shows that if the AgBr gelatin film holds considerable moisture a hardening is produced by a solarizing exposure, while a dry film is not thus hardened. The hardening may be observed by a difference in swelling, by bathing the plate in pinatype dyes, or best by partial fixation in 5% hypo. AgI gelatin plates are hardened so much as to give a palpable relief when soaked in water. L. DERR.

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Silver as Dye. H. LÜPPO-CRAMER. *Phot. Korr.*, 58, 184–8.—When boiled several minutes in 1% colloidal Ag prepared by the Carey Lea ferro-citrate method, wool and silk turn brown, cotton yellow, the silk becoming greenish-gray by reflected light on drying, reddish by transmitted light. The silk and wool colors are strongly resistant to oxidizers, to 50% KI soln., and to the ferricyanide and persulfate reducers used for photographic negatives. Cotton is less resistant. Analogous effects are produced when the same fibers are boiled in ammoniated $AgNO_3$, leading the author to his usual conclusion that the photo-halides are simply adsorption compounds of Ag halide and Ag. L. DERR.

Natural Color Photography. A. LEWY. *Z. angew. Chem.*, 24, 1956–7.—Description of a process for copying transparencies in color. Three photographic AgBr gelatin films are laid together, sensitized for red, green and blue separately, and exposed under the transparent picture to be copied. The exposed films are then separated and developed with pyro, which hardens the gelatin where the Ag deposit is, but not elsewhere. The Ag is removed with a strong ferricyanide-hypo reducer and the films immersed in red, blue and yellow dyes respectively, which penetrate and color only the unhardened gelatin. The films are then superposed and viewed by transmitted light. L. DERR.

Ammonium Persulfate. J. W. DODGSON. *Brit. J. Phot.*, 58, 593–4, 742.—The action of this salt in reducing a negative is first to dissolve a small quantity of Ag, forming Ag_2SO_4 and $(NH_4)_2SO_4$, and then to oxidize the gelatin, removing more Ag, partly mechanically and partly by exposing a lower layer of Ag to the fresh persulfate. L. DERR.

Effect of the Alkali in Photographic Development. L. BOURGEOIS. *Brit. J. Phot.*, 58, 650–2, 669–70, 683–6, 725–7, 742–4, 760–3, 780–2.—An abridged translation of a doctorate thesis at Lausanne Univ. The full text, 116 pp., is published by E. Lavanchy, Morges, Switzerland. L. DERR.

Powerful Intensification of Gelatin Plates. A. CALLIER. *Brit. J. Phot.*, 58, 452–3.—Take $K_4Fe(CN)_6$ 40 g., $Pb(NO_3)_2$ 60 g., AcOH 20 cc., water 1000 cc. After bleaching in this, the negative is washed in 3 or 4 3% HCl baths, 5 min. each. The ferrocyanides formed in the bleaching are thus converted into equally insol. chlorides. After washing thoroughly, a weak soln. of $(NH_4)_2S$ blackens the image. The process can be repeated. The last operation leaves a slight fog, which can be removed by placing a few min. in Br water followed by washing and a hypo bath. It is noted that the gelatin becomes insol. in boiling water in the portions intensified, but not in the others. L. DERR.

Action of Chromium Salts upon Gelatin. C. W. GAMBLE. *Brit. J. Phot.*, 58, 59–61.—Chiefly a review of the work of A. and L. Lumière and A. Seyewetz already noted in *C. A.* L. DERR.

Duplicating Lantern Slides Direct by Reversal. H. D'ARCY POWER. *Brit. J. Phot.*, 58, 194–5.—Expose from the glass side and develop to greater density than for a negative, then wash 3–5 min. Turn film side down in pan of water, with black paper in contact with film, and expose to full daylight 3–5 min. A bath of 0.5% $(NH_4)_2CrO_7$ will clear the image off; and, after a 15-min. washing, redevelopment and fixing complete the process except for a final washing. L. DERR.

The Ives Tripak Process of Color Photography. F. E. IVES AND H. F. BLACKBURN. *Brit. J. Phot.*, 58; *suppl.*, 41–3.—Three negatives are made on glass, as in the older Ives process, a print in clear gelatin made from each, and the prints separately dyed purple-red, yellow and blue and bound together, the picture being viewed by

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transmitted light. The novelty is in the camera, which uses the plates somewhat in the form of a film-pack, all three being exposed simultaneously. L. DERR.

Time Development. A. WATKINS. *Brit. J. Phot.*, 58, 3–6; cf. *C. A.*, 5, 837.—The "temp. coeff." is defined as the ratio of the times required to give the same amount of reduction by the developer at temps. 10° apart. With a pyro-soda developer it was found that dilution did not affect the temp. coeff.; that with the Hurter & Driffield standard pyro-soda developer the temp. coeff. varies with the plate used, slow-developing plates showing a higher value than quick-developing ones. Adding KBr increases the temp. coeff. of a plate which has a low coeff. with a non-bromided developer, while with plates whose coeff. with a non-bromided developer is already 2 there is no increase in temp. coeff. until the addition of KBr exceeds 0.1%. The temp. coeff. is about 2 and is practically invariable with all the plates tested, when the developer has the following comp.: Pyro 0.4, Na_2CO_3 crystals 2, Na_2SO_3 2, KBr 0.1, water 100. L. DERR.

Light-transforming Reflectors for Cooper-Hewitt and other Lamps. J. B. BAKER. *Brit. J. Phot.*, 58, 25–6.—Behind the tube is placed a white reflector coated with a translucent film impregnated with the dye rhodamine B. This by its fluorescence greatly improves the color quality of the light of the Hg vapor. L. DERR.

Cause of Reversal and its Remedy. E. S. SHEPHERD. *Phot. J.*, 51, 249–54; *Brit. J. Phot.*, 58, 463, 603–7.—A long known fact is that dehalogenization of the Ag salt in the exposure of a photographic plate is arrested in the absence of a halogen absorber. The ideal halogen absorber should not be reducible by light after its oxidation by the liberated halogen; it should not reduce the Ag salt in the dark, and should absorb the halogen as rapidly as it is liberated during the exposure. W. H. Caldwell has made the important discovery that all these properties are possessed by some salts of hydrazine and hydroxylamine. When hydrazine is added to the emulsion the exposure can be carried far beyond normal limits without appearance of the usual reversal effects, and several remarkable pictures of the sun, arc and incandescent lamps are given in illustration. Even an exposure 5000 times normal will give usable negatives. The addition of the hydrazine to the emulsion does not change its speed or color-sensitiveness, and the emulsions can be adapted to printing-out papers. It is suggested that reversal is ordinarily promoted by the halogen set free during the exposure, but that in this case it is immediately absorbed by the hydrazine, hence there is no reversal. L. DERR.

Hydrazine in Photographic Films. A. STREISSLER. *Phot. Chronik*, 18, 456; *Phot. Rundschau*, 25, 191–2; see preceding abstr. L. D.

Ash-free Gelatin (DHERE). 11.

U. S., 1,005,644, Oct. 10. L. D. DU HAURON and R. DE BERCEGOL, Joinville-le-Pont, France. **Making screens for use in color photography** by applying to a transparent support 2 colors in a greasy vehicle, in 2 series of intersecting lines, and filling the intervals between the lines with a color whose vehicle, *e. g.*, H_2O is not miscible with the greasy vehicle and is capable of entering the support, *e. g.*, gelatin.

Ger., 229,091, Jan. 26, 1909. J. TIMAR, Berlin, and FR. FUCHS, Rixdorf. **Reproduction of a photograph.** Upon a lithographic plate coated with a layer of asphaltum sensitive to light, the negative of the original is first transferred by copying, then the plate is dusted in the dark room with a fine mineral powder, and the layer is heated from above by means of a blowpipe flame, whereby it is securely pressed into the layer sensitive to light and the reproduction of the different shades is rendered possible. After the imprinting of the powder the plate is rolled with a coloring roller, developed

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in turpentine and water, edged and finished. They can be directly rolled with ceramic printing color and printed on paper used for metachromotypes.

Ger., 229,552, Nov. 8, 1902. *Idem.* Production of photographic pictures by means of screens. In relief screens or the layers in relief on the surface sensitive to the light, the deeper lying particles are colored or matted. The higher negative particles copy in normal, while in the deeper negative particles the reënforced copying influence is not only suppressed but is even reduced below the normal.

Ger., 228,967, Oct. 10, 1907. Addition to 226,614. R. WIDMANN, München. Production of photographic pictures by means of screens. In 226,614, relief screens are used as supports for the layer sensitive to light, and are nowhere impermeable to light, furnishing a copy in weak or strong copied particles. In order to change this copying contrast, screens are used in which the particles in relief are matted or colored, the greatest possible clearness being secured in the deeper points. This matting or coloring delays the action of the light, but does not exclude it.

6. INORGANIC CHEMISTRY.

H. I. SCHLESINGER.

Arsenides. I. Iron and Manganese Arsenides. SIEGFRIED HILPERT AND THEODOR DIECKMANN. Tech. Hochsch., Berlin. *Ber.*, 44, 2378–85.—In the formation of the arsenides, fusion is not necessary; the vapor of As reacts with the metals. Pure *iron arsenide*, $FeAs_2$, is prepd. by heating finely divided Fe with an excess of As. The mixture is heated in a Jena glass bomb tube for 6–8 hrs. at 700°. M. p. is taken in a fused quartz tube and found to be about 1000°. When $FeAs_2$ is heated in a current of H at 700°, As distils off, leaving pure FeAs. The same method is used in preparing *manganese arsenide*. The MnAs is strongly magnetic (see following abstract) at ordinary temp.; when heated to 40–50° the magnetic properties disappear. MnAs heated in the air burns. When distilled in a current of H, a product poor in As is formed. The arsenides of Mn are gray-black; sp. gr. 6.2. The arsenides of Mn do not resemble those of Fe. LILLIAN COHEN.

More Ferro-magnetic Compounds of Manganese. E. WEDEKIND AND TH. VEIT. Munich. *Ber.*, 44, 2663–70; *C. A.*, 3, 291; 4, 143.—The following new substances are formed, or else new methods are given for their formation; *manganese bismuthide*, MnBi; *manganese telluride*, MnTe; *manganese selenide*, MnSe; *manganese arsenides*, MnAs, $MnAs_2$; *manganese silicide*, MnSi; and *manganese sulfide*, MnS. Most of these are formed by the manganese thermite method, or else by direct combination of the elements. The MnBi is magnetic, the manganese selenide and tellurides are weakly magnetic, and the MnS formed by the alumino-thermite process is weakly magnetic, but on heating in the air it is strongly magnetic. MnAs behaves in a similar manner. By heating MnAs in the elec. arc for a short time, Mn_2As is formed, which is very magnetic. When Mn_2As is heated in the air, arsenides are formed, which are magnetic. Mn_2Si is not magnetic. Mn_3C, *manganese carbide*, formed in the elec. furnace is magnetic. MnBi is cryst., reacts readily with acids, except conc. HCl. The selenide and telluride are formed directly from the elements, both react readily with H_2O, acids and Cl. The telluride is more stable than the selenide. The silicide is relatively stable towards acids. LILLIAN COHEN.

Action of Calcium Fluoride on Vanadium Pentoxide. W. PRANDTL AND H. MANTZ. Kgl. Bayr. Akad. Wissensch., Munich. *Ber.*, 44, 2582–5.—When V_2O_5 and CaF_2 are heated in a Pt app. in an atm. of N free from moisture and O, a colorless gas is formed. This is supposed to be a mixt. of VOF_3, VOF_2 and oxyfluorides with less. F. L. C.

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The Ferronitrosulfides and their Relation to the Nitroprussides. III. J. O. ROSENBERG. *Arkiv. Kem. Min. Geol.*, 4, No. 3, 1–76.—Numerous objections are raised to the formulas as proposed by Bellucci and Cesaris (*C. A.*, 3, 292) and others for the ferronitrosulfides, and their prep. is discussed. The addition of 0.1 *N* Na_2S_2 to 0.4 *N* $FeCl_2$ satd. with NO at —2° is given as the best procedure. 0.04 *N* K_2S yields black Roussin salts, while *N* K_2S gives the red salt stable in the presence of excess of alkali sulfide. Hot *N* KOH will also decompose ferronitrosulfide, forming the red salt. The pure salt in cryst. form was obtained by evapg. in a vacuum a soln. from ferronitrosulfide under the action of Na_2S. The comp. of these was found to agree with the formula $Fe_2(NO)_4S_2Na_2.4H_2O$. The results obtainable from analysis of the ferronitrosulfide were more or less hypothetical, but suggest $Fe(NO)_2S_2$, or $Fe(NO)_2S_4$. The reactions met with in the course of the foregoing are:

(1) $FeCl_2 + 2NO = Cl_2Fe(NO)_2$

(2) $(ON)_2FeCl_2 + Na_2S_2 = 2NaCl + (ON)_2FeS_2S$ (ferronitrosulfide)

(3) $2(ON)_2FeS_2S + Na_2S = (ON)_2Fe.SNa \cdot (ON)_2Fe.SNa + 5S$ (red Roussin's salt)

(4) $2Fe(NO)_2S_2 + Fe_2(NO)_4S_2Na_2 + H_2O = Fe_4(NO)_7S_3Na + NaNO_2 + H_2S + 4S$ (black salt)

C. G. GILBERT.

Polymorphism of Nickel. A. BAIKOV. Met. Lab. Polytechn. Inst., St Petersburg. *J. Russ. Phys. Chem. Soc.*, 42, 1380–5.—Like Fe and Co, Ni loses its magnetic properties above 340°. But while the first 2 assume another form with the loss of magnetic properties, no such transformation point could be detd. for Ni by the thermometric method. By an exam. of the cooling process with Kurnakov's differential pyrometer such a point for Ni was found at 360.8°, Hence Ni also exists in two forms: α-Ni, magnetic, stable below 360.8°, and β-Ni, unmagnetic, stable only above 360.8°.

H. M. GORDIN.

Zinc Peroxide.. P. KASANETZKII. Lab. Polytechn. Inst., Kiev. *J. Russ. Phys. Chem. Soc.*, 42, 1452–8.—*Zinc peroxide* containing some carbonate and H_2O, was obtained by treating Na, K or NH_4 zincates with H_2O_2 (30%) below 0°; small crystals; loses 9.7% H_2O at 120°; explodes at 178° with evolution of O and H_2O; heated with powdered Al it explodes with pale flame; behaves towards reagents both as a true peroxide and as a peroxide of the MnO_2 type. Hence it is assigned the formula

$$Zn\begin{matrix}O\\|\\O\end{matrix}.2Zn : O : O.3H_2O.$$

H. M. GORDIN.

Inorganic Peroxides. I. Preparation of the Peroxides of Cadmium and Zinc. I. S. TELETOV. Chem. Lab. Imper., Univ. Warshava. *J. Russ. Phys. Chem. Soc.*, 43, 131–5.—These peroxides were made by the action of an excess of H_2O_2 (30%) on $CdSO_4$ and $ZnSO_4$. The analytical data point to any 1 of the following 4 formulas for each peroxide: $5CdO_2.CdO.3H_2O$, $5CdO_2.3CdO.5H_2O$, $Cd(OH)_2.5CdO_2.2H_2O$, $3Cd(OH)_2.5CdO_2.2H_2O$, $10ZnO_2.4ZnO.5H_2O$, $8ZnO_2.4ZnO.7H_2O$, $4Zn(OH)_2.10ZnO_2.H_2O$, $4Zn(OH)_2.8ZnO_2.3H_2O$. The constancy of comp. of these compds. is doubtful.

H. M. GORDIN.

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Hydrothermal Silicates. EMIL BAUR. Techn. Hochsch., Braunschweig. **Optical Examination.** F. BECK. Vienna. *Z. anorg. Chem.*, 72, 119–61.—Hydrothermal silicates were prepd. by heating the components in a steel bomb to 350–400°. Small quantities were used and the products examined microscopically, no analyses being made. Results are given in detail in tables and curves. GEORGE W. MOREY.

The Binary Systems of Magnesium Chloride and Calcium Chloride with the Chlorides of K, Na, Ag, Pb, Cu^{I}, Zn, Sn^{II}, and Cd. OTTO MENGE. Inst. anorg. Chem., Göttingen. *Z. anorg. Chem.*, 72, 162–212.—For method and app. (see Herrmann, *C. A.*, 5, 3545). In all salt pairs containing $MgCl_2$, a correction was necessary because of its decomp. into MgO, insol. in all the melts. In the system $MgCl_2$–$CaCl_2$ the components are miscible in the solid phase between the limits 87.1–100% $CaCl_2$. The m. p. of $MgCl_2$ is 711°; of $CaCl_2$, 777°, and the eutectic is at 42.8% $CaCl_2$ and 621°. Two compds. are formed in the system $MgCl_2$–KCl (m. p. 776°); KCl.$MgCl_2$ (m. p. 480°) and 2KCl.$MgCl_2$ (m. p. 446°). The $MgCl_2$–KCl.$MgCl_2$ eutectic is at 36.9% KCl and 470°; the KCl.$MgCl_2$–2KCl.$MgCl_2$ eutectic at 60.2% KCl and 433°; the 2KCl.$MgCl_2$–KCl eutectic at 62% KCl and 426°. Mixed crystals are probably formed between 43.9 and 45% KCl. In the system $MgCl_2$–NaCl (m. p. 803°), the $MgCl_2$ pptd. primarily reacts with the melt at 448° and 39.4% NaCl to form a compd., probably NaCl.$MgCl_2$. The eutectic is at 43.9% NaCl and 430°. Similarly, NaCl pptd. primarily from 100–50.2% reacts with the melt at 464°, forming a compd., probably 2NaCl.$MgCl_2$. Neither of the above compds. could be characterized definitly since the reaction was incomplete. The system $MgCl_2$–AgCl belongs to the simple type, with a eutectic at 91% AgCl and 452°; the m. p. of AgCl is 455°. The systems $MgCl_2$–$PbCl_2$ (m. p. 496°) and $MgCl_2$–Cu_2Cl_2 (m. p. 418°) are similar, with eutectics at 91% $PbCl_2$ and 455°, and 96% Cu_2Cl_2 and 406°, respectively. The observation of Monkmeyer that anisotropic Cu_2Cl_2 crystallizes from melts, later changing to the isotropic form, could not be confirmed. The fusion diagrams of the systems $MgCl_2$–$ZnCl_2$ (m. p. 271°) and $MgCl_2$–$SnCl_2$ (m. p. 245°) both show the limiting case of the ordinary type, the eutectic being practically 100% $ZnCl_2$ and $SnCl_2$ resp. $MgCl_2$ and $CdCl_2$ (m. p. 563°) are completely miscible in the solid phase, the m. p. of mixts. lying between those of the 2 components. In the system $CaCl_2$–KCl a compd. KCl.$CaCl_2$ is formed, m. p. 754°. The $CaCl_2$–KCl.$CaCl_2$ eutectic is at 19% KCl and 641°, the KCl.$CaCl_2$–KCl eutectic at 66% KCl and 600°. In the system $CaCl_2$–NaCl the primarily crystallized NaCl reacts with the melt at 46% NaCl and 605° to form a compd. of the probable comp. 4NaCl.$CaCl_2$. The eutectic is at 32% NaCl and 500°. Mixed crystals are probably formed above 90% NaCl. The systems $CaCl_2$–AgCl, $CaCl_2$–$PbCl_2$, and $CaCl_2$–Cu_2Cl_2 resemble one another, no mixed crystals being found and the eutectic being at a low conc. of $CaCl_2$. The eutectic of the first is at 86% AgCl and 448°, of the 2nd at 83% $PbCl_2$ and 467°, of the 3rd at 88% Cu_2Cl_2 and 393°. The systems $CaCl_2$–$ZnCl_2$ and $CaCl_2$–$SnCl_2$ also resemble each other, both eutectics being at a conc. practically 100% $ZnCl_2$ or $SnCl_2$. The curve in the latter case could be followed only between 66–100% $SnCl_2$, because of the volatility of the latter. A complete series of mixed crystals is formed in the system $CaCl_2$–$CdCl_2$, with a m. p. minimum at 90% $CdCl_2$ and 540°. A comparison of the above with data for the metals themselves shows that where the two metals form compds. their chlorides do not and *vice versa*.

GEORGE W. MOREY.

Peroxides. C. TUBANDT AND W. RIEDEL. Univ. Halle. *Ber.*, 44, 2565–70.—Tanatar (*C. A.*, 4, 999) states that Ni forms a true peroxide, when the hydroxide is oxidized with HBrO; this peroxide giving H_2O_2 with acids. The authors find that Caro's acid and not H_2O_2 is formed when the superoxide of Ni is treated with dil. H_2SO_4. Furthermore they do not ascribe the formation of H_2O_2 to the decomp. of the per-

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oxide, when Ni peroxide acts on HCN in the presence of KCN. This latter action is due to the auto-oxidizing action of the complex Ni cyanogen compd. formed. If any salt of Ni is introduced into the soln. of dil. H_2SO_4 and KCN, the test for H_2O_2 with Ti is given. LILLIAN COHEN.

Nickel Superoxide, Especially its Behavior in the Formation of Salts. C. TUBANDT AND W. RIEDEL. Chem. Inst., Univ. Halle. *Z. anorg. Chem.*, **72**, 219–32; cf. preceding abstract.—By the action of oxidizing agents on Ni^{II} solns. only black NiO_2 is pptd. When a conc. $NaHCO_3$ soln., cooled to 0°, was treated with a Ni^{II} salt and O_2, a deep red soln. was obtained, probably a colloidal soln. of NiO_2. An examination of the $Ni(OAc)_2$ soln. of Benedict (*J. Am. Chem. Soc.*, **28**, 171) with the ultramicroscope showed it to be colloidal NiO_2 soln.; similar results were obtained whenever NiO_2 was decomp. by an acid. When the colloidal soln. obtained with NiO_2 and H_3PO_4 was made alkaline and the Ni filtered off the filtrate still possessed oxidizing properties, which the authors believe due to formation of permonophosphoric acid. The reactions of the $Ni_2(SO_4)_3$ of Benedict are explained by the formation of Caro's acid, the color by the presence of Mn. Since NiO_2 oxidizes Mn oxides to $HMnO_4$ in the presence of H_2SO_4 the authors propose its use in the detn. of Mn in place of PbO_2. By electrolytic oxidation similar red solns. were obtained, especially with $KHCO_3$ solns., but they too are probably colloidal solns. of NiO_2.

GEORGE W. MOREY.

The Study of Halogenated and Oxyhalogenated Derivatives of Thorium. ED. CHAUVENET. Montpellier. *Ann. chim. phys.*, **23**, 425–90.—Largely a summary of work previously abstracted (*C. A.*, **2**, 2343; **3**, 1001, 1968, 2097, 2780; **4**, 1267; **5**, 1036, 1716, 3206). By pptg. $Th(NO_3)_4$ with AgF and drying the ppt. in the air $ThF_4.8H_2O$ was obtained. Further drying in vacuum gives $ThF_4.4H_2O$, which becomes $ThF_4.2H_2O$ at 100° and $Th(OH)F_2.H_2O$ at 250°. Anhydrous $ThCl_4$ was prepd. by (1) the $COCl_2$ method (*C. A.*, **5**, 1036), (2) evapn. and subsequent ignition of a $ThCl_4$–NH_4Cl soln., (3) ignition of $ThOCl_2$. The heat of formation of $ThCl_4$ is 339.43 cal. Hydrates of $ThCl_4$ with 7, 4, and 2 H_2O were prepd. from $ThCl_4.8H_2O$ by drying in air, at 90°, and at 100° respectively. $Th(OH)Cl_2.H_2O$ was obtained at 120–160° and $ThOCl_2$ at 250°. From $Th(OH)I_2.10H_2O$, prepd. by evapn. of a soln. of $Th(OH)_4$ in HI, $ThOI_2.3\frac{1}{2}H_2O$ is prepd. by drying in the air, and $ThOI_2$ by drying at 50° in a current of H. Freshly pptd. thorium hydroxide loses H_2O in the air until the comp. $Th(OH)_4.1.3H_2O$ is reached. Dried in vacuum $Th(OH)_4$ is obtained, dried at 95° in a current of H, $Th(OH)_4$ in a polymerized form, at 175°, metathoric acid, $ThO_2.H_2O$, at 220°, $(ThO_2)_6.5H_2O$, and at 430°, ThO_2. The heat of formation of ThO_2 is 330 cal. $ThCO_3.ThO.4H_2O$ was prepd. by the action of CO_2 on $Th(OH)_4$, prepd. *in vacuo*. The heats of formation and soln. of a large no. of compds. are included in the paper. GEORGE W. MOREY.

Double Salts Formed by Slightly Soluble Sulfates with Alkaline Sulfates. M. BARRE. Univ. Paris. *Ann. chim. phys.*, **24**, 145–256.—Largely a summary of work previously abstracted (*C. A.*, **3**, 2096, 2781; **4**, 2076, 2421, 2614, 2776; **5**, 435). Hg_2SO_4 was also studied, but no compds. were formed. The heat of soln. of a number of double salts was detd. and the results are given in tabular form. G. W. M.

Halides and Oxides of the Alkali and Alkaline Earth Metals. M. DE FORCRAND. *Ann. chim. phys.*, **24**, 256–82.—Amplification of work previously abstracted (*C. A.*, **5**, 1016, 1870). GEORGE W. MOREY.

The Oxidation of Hydrazine. VI. Reaction between Mercuric Oxide and Hydrazine Hydrate in Alcoholic Solution. C. F. HALE AND V. E. NUNEZ. Cornell Univ. *J. Am. Chem. Soc.*, **33**, 1555–63.—Oxidation by yellow HgO is substantially to N_2. An appreciable deficit in % of N formed is attributed, in part at least, to the formation

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of ethylidene azine. Qual. tests indicate the formation of $Hg(C_2H_5)_2$ and a solid compound of C, H, and Hg as by-products. A. R. MIDDLETON.

Isomeric Inorganic Compounds. ADOLPH LAW VOGE. *J. Am. Chem. Soc.*, 33, 1563–6.—A list of 22 cases of polymerism and isomerism not previously noted. A. R. MIDDLETON.

The Oxidation of Hydrazoic Acid. HAROLD EATON RIEGGER. Cornell Univ. *J. Am. Chem. Soc.*, 33, 1569–76.—HN_3 is oxidized by $KMnO_4$ vigorously, by $KHSO_4$ considerably, by $KClO_3$ and by MnO_2 slightly and by $Fe_2O_3.H_2O_2$, and KIO_3 not at all. Hence the low yield of HN_3 in oxidation of N_2H_4 is probably not due to its oxidation as suggested by Thiele (cf. *C. A.*, 2, 3315). A. R. MIDDLETON.

The Asymmetric Cobalt Atom. II. A. WERNER. Univ. of Zürich. *Ber.*, 44, 2245–55; cf. *C. A.*, 5, 3770.—Compds. of the complex radical $[A_2Co\ en_2]$, in which the groups A are in the *cis* position, possess a kind of mol. asymmetry since object and mirror-image have no plane of symmetry. As other kinds of mol. asymmetry are possible, W. designates this as *molecular asymmetry I.* In conformity with the theory, optically active isomers were isolated in the 1,2-dinitrodiethylenediamine-cobaltic salts (flavo series). An improved method for prep. of these salts is described. Contrary to their action on active compds. of C, α-camphorsulfonic acid forms a less sol. *l*-salt, while *d*-α-bromocamphorsulfonic acid forms a less sol. *d*-salt with these Co complexes. After sepn., the active camphorsulfonate and bromocamphorsulfonate were decomposed in hot conc. aq. soln. by NaI, the active iodides pptg. as a brown cryst. dust. These, with Ag_2O, gave the bases and these by neutralization gave various salts, all of which, like the *d-l* forms, are anhydrous. The active salts show anomalous rotation dispersion. The plane of the D line is strongly rotated, that of the C line little or not at all. In consequence the bright fields are yellow and the dark fields orange and exact detn. of the rotation is difficult. Attempts to split the 1,6-dinitro salts (croceo series) yielded no active isomers, although cryst. camphorsulfonates were obtained, a result in accord with the theory of the octahedral formula. The following new compds. are described: *l-1,2-Dinitrodiethylenediaminecobalti d-camphorsulfonate*, $[(O_2N)_2Co\ en_2][O_3S.C_{10}H_{15}O]$, long, bright yellow spears, brownish by reflected light. $[\alpha]_D = -16°$. *d-1,2-Dinitrodiethylenediaminecobalti d-bromocamphorsulfonate*, $[(O_2N)_2Co\ en_2][O_3S.C_{10}H_{14}OBr]$, flat brown-yellow crystals, 1 cm. long. $[\alpha]_D = +66°$. *1,6-Dinitrodiethylenediaminecobalti d-camphorsulfonate*, $[(O_2N)_2Co\ en_2][O_3S.C_{10}H_{15}O]$, cryst. only from very conc. aq. soln., thick amber prisms, often several cm. long. $[\alpha]_D = +19°$. Addition of NH_4Br gave $[1.6\text{-}(O_2N)_2Co\ en_2]Br$, entirely inactive. The following *active* salts of $[1,2\text{-}(O_2N)_2Co\ en_2]$ were prepared. *Chlorides*, brown-yellow columnar crystals, markedly distinct from the *dl*-salt which forms thick dark brown plates. *Bromides*, resemble the chlorides and differ similarly from the *dl*-form. *Iodides*, well developed octahedrons, while the *dl* form is only micro-cryst. *Nitrates*, thick prismatic to columnar crystals, distinct from the long oblique-angled prisms of the *dl* form. *Sulfates*, prismatic to tabular crystals distinct from the long silky needles of the *dl* form. *Perchlorates*, well defined aggregates of short, thick, overlapping tables. The *dl-perchlorate*, not previously described, was prepared by treating a conc. aq. soln. of the nitrate with $HClO_4$. Solubilities for the various salts are given. (In *C. A.*, 5, 3770, read "chloroammino," etc., instead of "chloroamino.") A. R. MIDDLETON.

Vanadium Bromides. OTTO RUFF AND HERBERT LICKFETT. Tech. Highschool, Danzig. *Ber.*, 44, 2534–8; cf. *C. A.*, 5, 1879.—A quant. yield of VBr_3 is obtained by the action of Br on V_4C_3 at 500–600°. A mixt. of equal parts of Br and S_2Br_2 was led over 18 g. V_2O_5 and 3–4 g. S at red heat and the product distilled in vacuum. Br passes off at 30°. S_2Br_2 at 57°, and finally S. The temp. was slowly raised to 260°

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and maintained 8 hrs. $VOBr_2$ remains as a bright yellow residue. This loses Br above 320° and forms *vanadium oxybromide*, *VOBr*, violet octahedrons, decomp. 480° in vacuum to V_2O_3 and VBr_3. $D_{18} = 4.0002$. A. R. MIDDLETON.

Vanadium Fluorides. OTTO RUFF AND HERBERT LICKFETT. Tech. Highschool, Danzig. *Ber.*, 44, 2539–49.—By heating VCl_3 in a Pt tube for 8 hrs. in a stream of dry HF, the authors prepared *vanadium trifluoride*, VF_3, yellow-green, practically insol. in all ordinary solvents, m. above 800°, sublimes at bright red heat. $D_{19} = 3.3628$. By action of anhyd. HF in the cold on VCl_4, *vanadium tetrafluoride*, VF_4, was obtained; brown-yellow powder, extremely hygroscopic, decomposes in air to a blue liquid, forms a blue soln. in H_2O. $D_{23} = 2.9749$. Heated in N above 325°, it forms VF_3 and VF_5. *Vanadium oxydifluoride*, VOF_2, was prepared by heating $VOBr_3$ in dry HF at dark red heat for 6 hrs. It is a yellow solid; $D_{19} = 3.3956$. From $VOCl_3$ and anhyd. HF in the cold, *vanadium oxytrifluoride*, VOF_3, was obtained; yellow-white, very hard, extremely hygroscopic, decomposes in air to a brown-yellow soln., attacked glass slowly at ord. temp., strongly on heating, with formation of V_2O_5. M. 300° and b. 480°. $D_{20\cdot5} = 2.4591$. It was also prepared by heating VF_3 in O at red heat for 45 min. *Vanadium pentafluoride*, VF_5, was obtained by heating VF_4 in dry N in an electrically heated Pt tube, slowly to 650° for 2.5 hrs. VF_3 remained as a residue, VF_5 was evolved and condensed on a Pt tube surrounded by CO_2-alc. (—79°); pure white solid, having a notable b. p. at ord. temp. In moist air it becomes yellow from formation of oxyfluorides. It attacks glass slowly at ord. temp., rapidly on warming, with formation of red V_2O_5; $D_{19} = 2.1766$; b_{758} 111.2°. When heated in a m. p. tube, it was still solid at 200°, when the tube burst from formation of SiF_4. A. R. MIDDLETON.

Magnesium. ANON. *Eng. Mining J.*, 92, 12. J. J. M.

Double Salts of Lead Fluoride with other Halogen Salts of the Same Metal. CARLO SANDONNINI. Ist. chim. gen. r. univ. Padova. *Gazz. chim. ital.*, 41, II, 144–55; cf. *C. A.*, 5, 2043. C. A. R.

Complex Salts. X. Some Pseudo-chlorides of Iridium. Condensed Chlorides. MARCEL DELÉPINE. École super. Pharm., Paris. *Bull. soc. chim.*, 9, 829–36; see *C. A.*, 5, 3021. EDW. WOLESENSKY.

Chromic Sulfates and Ions. ALB. COLSON. *Bull. soc. chim.*, 9, 862–8.—The sulfates of Cr furnish an example of inorganic compds. in aqueous soln. in which the cond. and the degree of ionization as determined by cryoscopic measurements seem to be independent of each other. Although the ordinary violet, cryst. sulfate and the green sulfate obtained by reducing CrO_3 with SO_2 at 0° produce the same depression of the f. p. in solns. of equal conc., the cond. of the latter is 20% higher than that of the former. Thermochem. studies show that in the green solns. practically all of the acid is combined, and that in a complex manner. The cond. changes very much with changes in temp. and conc. Also, it seems that the violet sulfate which so easily yields SO_4 ions is a poorer conductor than the green sulfate which does not contain the simple SO_4 ions. Yet, in all cases, the depression of the f. p. remains always the same. EDW. WOLESENSKY.

Equilibrium between Chloro-pentamminecobaltic Chloride and Aquopentammine-cobaltic Chloride in Aqueous Solution. ROBERT PERS. *Compt. rend.*, 153, 673–5.—Solns. of the purpureo and roseo cobaltic chlorides when left to themselves for a time, pass from a violet-red and yellow, resp., to orange-red. When a soln. of the purpureo chloride (acidulated with HCl) is boiled for ten mins. and then rapidly cooled, it is found to contain some of the roseo salt. Both of these at the same time seem to decompose slowly, yielding $CoCl_2$. Curves are given, also a table, showing that if there

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were no decomp. of the complex chlorides the boiling soln. would reach an equil. when 42% of the material is in the form of the purpureo and 58% in the form of the roseo chloride. EDW. WÖLESENSKY.

The Preparation and Properties of Metallic Cerium. ALCAN HIRSCH. *Trans. Am. Electrochem. Soc.*, **20**, (not yet in print).—Pure anhydrous $CeCl_3$ was prepared as follows: The double $CeNH_4$ nitrate as obtained in the sepn. from the other rare earths was digested with HCl on a sand bath for about 3 weeks or until the nitrates are converted to chlorides and all NH_4 salts are removed. The white solid was then heated to convert it to the monohydrated chloride and then treated with dry HCl gas. The chloride m. to a clear, limpid liquid, and is suitable for electrolysis. An anhydrous fluoride was prepared as follows: The mixed oxides of the rare metals were digested with conc. HCl in a steam closet until a clear soln. of chlorides was obtained. The hot soln. containing only a slight excess of HCl was transferred to a Pb jar and conc. HF added to complete pptn. The fluorides were allowed to settle and after the supernatant liquid was syphoned off, washed twice with hot water and several times with 95% alc. and then the alc. removed in a Pb-lined cage-centrifuge. Abs. alc. was added, the soln. evapd. to dryness, dried at 100° and the temp. raised to 200° at the end. *Electrolytic prep. of Ce:* The cathode was Fe and the anode was of graphite. The electrolyte was $CeCl_3$ containing a small % of NaCl, to which very small amts. of KF- and KF-$BaCl_2$ mixt. were added when required (about every ½ hr.). The voltage should not be greater than 15 v. The av. current used was 200 amps. for 3 hrs. The best method of purifying Ce is the amalgam method. The Fe and other impurities float to the top and are skimmed off. The Ce and Hg may be sepd. by distilling the latter, but this must be done in a high vacuum to prevent oxidation of the Ce. The amalgam should be placed in a Mg vessel, and this in turn heated in an evacuated quartz vessel, because of the high temp. required to drive off all the Hg. The physical consts. detd. were as follows: At. wt., 140.25; d_{25}, 6.92; sp. resistance, 71.6 microhms per cm. cube; m. p., 635°; ultimate strength, 12,900 lbs. per sq. in.; sp. ht., 0.0524; heat of oxidation, CeO_2 = 243,600; the av. hardness value for rolled surface was 25.9 and for freshly cut surface was 9.5 (standard steel test plate 100); Ce is malleable and highly ductil, a strip being rolled to 0.015 mm.; pure Ce is paramagnetic. No crystals could be obtained but the interior of many ingots of Ce were highly cryst. The heat cond. and latent heat of fusion seemed to be fairly high. Alloys of Ce with all the metals are discussed but the Mg alloy seems to be the only one of practical importance, it being used in thermal reductions. G. F. YESSLER.

Preparation of Perborates (FUHRMANN). **18.**

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7. ANALYTICAL CHEMISTRY.

E. G. R. ARDAGH.

The Development of Analytical Chemistry. E. WILKE-DÖRFURT. Göttingen. *Z. Electrochem.*, **17**, 623–9.—Address treating of the influence of physical chem. on the development of analytical chem. GEORGE W. MOREY.

A New Method of Chemical Analysis. J. J. THOMSON. *Chem. News*, **103**, 265–8; cf. *C. A.*, **5**, 3388.—The positive rays, on which T. has been engaged for the last few years (*C. A.*, **3**, 277; **5**, 235, 1366), can be used to detect the gases in a vacuum tube; not only will they tell us whether an element is present, but they will tell us whether it is present in the atomic or mol. condition, and whether there are allotropic modifications present, or still more complex aggregations. They also enable us to det.

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the at. wts. of the elements present. The method possesses several advantages: (1) It is rapid, and hence permits detection of intermediate forms which have only a transient existence; (2) it obviates the necessity of isolation or purification; (3) it requires extremely small amts. of substance, not more than 0.01 mg. being required to det. the at. wt. within 1%. It is consequently much more sensitive than the spectroscope. Many of the results obtained are in agreement with the author's view of chem. combination and also with his "corpuscular theory of matter" (*C. A.*, **3**, 1352; **5**, 3361). He is hopeful that this new method of investigation may be of service in throwing light on the nature of chem. combination. The method is as follows: The positive rays, after passing through a fine tube in the cathode, are exposed simultaneously to magnetic and elec. forces, the magnetic field being arranged so as to produce a vertical deflection of the rays, while the elec. field produces a horizontal deflection. The rays are photographed by a method described in *C. A.*, **5**, 1366. If we call *P* the point where any deflected ray strikes the plate, it is shown that the locus of *P* is a parabola. The reason we get a curve instead of a point is that the slower rays suffer greater deflection than the quicker ones. If we wish to compare the value of m/e for 2 different rays, we need only measure the horizontal deflection *ON* and the vertical deflection *PN*. $m/e = ON/PN^2$. Each type of carrier produces its own line on the plate; we can in consequence not only det. the no. of carriers, but from the dimensions of the curves we can at once det. the at. wt. of the carrier, and hence its nature.

E. G. R. ARDAGH.

General Separation Process without the Use of Hydrogen Sulfide. E. EBLER. Univ. Heidelberg. *Z. anal. Chem.*, 50, 603–9.—Modifications are given of the author's original method (*Z. anorg. Chem.*, 48, 61–85 (1905)); the metals to which these changes apply are As, U, the alk. earths and the alkalies; complex cyanides are destroyed with aqua regia. Numerous references to articles bearing on the problem are given.

E. G. R. ARDAGH.

New Quantitative Procedure for Separating Iron and Manganese. J. A. SANCHEZ. *Bull. soc. chim.*, 9, 880–1.—To the slightly acid Fe and Mn soln. having a bulk of about 200 cc., add pyridin in slight excess, boil for 10 min., filter and wash, first with hot water satd. with pyridin and then with boiling H_2O alone. Double pptn. is recommended if much Mn is present. Zn must not be present for it is pptd. by pyridin. By this method the author states that 0.5 mg. of Mn can be sepd. from 1 g. of Fe. No results are given.

R. A. CUNNINGHAM.

The Analysis of Substances Containing Titanium. K. BORNEMANN. Aachen. *Stahl u. Eisen.*, 31, 708–11.—The author's review of *C. A.*, **5**, 1242, 1719.

E. J. WITZEMANN.

Use of Hematein in Qualitative Analysis and in the Volumetric Determination of Bismuth. ETTORE VASSALLO. Ist. chim. gen. r univ. Pavia. *Gazz. chim. ital.*, 41, II, 204–12.—Strips of filter paper, dipped in an alc. ext. of logwood and dried in an atm. free of NH_3, give characteristic color reactions with many metals and metalloids in neutral or nearly neutral soln., but in only a few cases are these colors persistent in weakly acid soln. Such are, *e. g.*, Bi salts, which give an intense violet color, stable in even quite strongly acid soln.; As, Sb, Sn likewise give violet colors, but beyond a certain limit of acidity only a reddish spot is obtained. Mo gives a blue color stable in acids. To distinguish these colors, after the drop of soln. has been placed on the paper, the latter is dropped into a dish of slightly acidulated H_2O, thus making the paper more or less transparent, diminishing the intensity of the original chestnut color and diluting the acid with which the paper is impregnated. To detect Sn and Bi, the powdered mineral or alloy is treated repeatedly with HNO_3 and a few crystals of Na_2SO_4 and heated until no more nitrous vapors are evolved (not to dryness), taken

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up with H_2O, filtered, the residue washed with HNO_3, b. with satd. tartaric acid, and the residue b. a few moments with a little H_2O and a few fragments of KOH and NaOH. If no Sn is present, the blue color imparted to hematein paper by this alk. soln. will disappear completely in HNO_3, but in the presence of Sn a violet stain will remain. A portion of the original filtrate, containing Bi, As and Mo, is treated with a few drops of NH_3, Na phosphate in excess and NaCl, warmed to about 40°, and filtered; if Bi is present, the filtrate will give a violet color with the hematein paper. In another portion of the original filtrate, the Bi is pptd. by alkalies; if Mo is present, the blue stain produced will not disappear when the paper is placed in HNO_3. For the volumetric detn. of Bi, a standard soln. of Na_2HPO_4 is run in until the supernatant liquid no longer gives the characteristic Bi stain. The best results are obtained with cold, nearly neutral solutions. CHAS. A. ROUILLER.

Some New Applications of Amalgamated Aluminium and its Uses in Analysis. E. KOHN; Abrest. *Bull. assoc. chim. sucr. dist.*, 28, 938–43.—Al, amalgamated by dipping into a soln. of $HgCl_2$, oxidizes rapidly in H_2O with evolution of H. The amt. of Hg fixed and the rapidity of subsequent reaction depends upon the conc. of the $HgCl_2$ and length of time of immersion. The Hg, after H_2O is added, is found in the Al ppt., partly in metallic state, and partly in a form sol. in HCl; none is dissolved in the H_2O. Amalgamated Al ppts. tannin from soln. in form of Al tannate. 100 cc. of a 1% tannin soln. lost all of its tannin in 5 hrs. by adding 0.2 g. of Al containing 4 mg. of Hg. Coloring matters are also removed. Amalgamated Al might be used for purifying certain industrial waters, or as a substitute of basic PbOAc. For this purpose, the metal is amalgamated by immersion for 3 min. in 0.5% soln. of $HgCl_2$. The action is complete in 6–7 hrs., when 200 cc. of the soln. are treated with 5 g. of this material. A. H. BRYAN.

Analysis of Commercial Aluminium Sulfate. J. C. DELAGE. *Ann. chim. anal.*, 16, 325–8.—Brief notes on processes of mfg. $Al_2(SO_4)_3$ with methods for detg. Al_2O_3, Fe, insol. in water and free acid. Attention is called to influence of organic matter on detn. of $Al_2O_3 + Fe_2O_3$. Methods given are those in general use and described in all books on quant. analysis. F. W. SMITHER.

Determination of Ferrocyanides and Thiocyanates. L. RONNET. *Ann. chim. anal.*, 16, 336–7.—The method was applied to the exam. of solns. resulting from the purification of illuminating gas, and is as follows: Acidify a known vol. strongly with HCl, add a slight excess of warm $FeCl_3$ soln., digest on water bath half hr., filter and wash with boiling water till filtrate is neutral and colorless. Put the ppt. in a graduated flask, treat with 10% KOH soln., and digest with frequent agitation about 12–16 hrs., make up to mark with water, mix, filter through dry paper, and take an aliquot; acidify with 10% H_2SO_4 and titrate the luke-warm soln. with 0.1 *N* $KMnO_4$, 1 cc. of which = 0.0422 g. $K_4Fe(CN)_6 + 3H_2O$ or 0.02866 g. $Fe_4(FeC_6N_6)_3$. *Thiocyanates:* Make up the first filtrate above to vol. and take an aliquot, add $NaHSO_3$ soln. till decolorized, heat on steam bath, and add a slight excess of 10% $CuSO_4$ soln., warm half hr., filter and wash with hot water till free from $CuSO_4$. Dissolve ppt. of CuCNS in dil. NH_4OH, acidify with dil. H_2SO_4 and titrate the warm soln. with 0.1 *N* $KMnO_4$. 1 cc. of the $KMnO_4$ soln. = 0.001616 g. KCNS, 0.001266 g. NH_4CNS and 0.00175 g. $Ca(CNS)_2 + 3H_2O$. F. W. SMITHER.

Gravimetric Determination of Nickel and Cobalt. L. DEDE. *Chem. Ztg.*, 35, 1077.—By substituting $K_2S_2O_8$ or $Na_2S_2O_8$ for Br as oxidizing agent, one requires only a very small excess of alkali hydroxide which can be quite easily washed out of the ppt. To the cold Ni, Co soln. add enough alkali to insure alkalinity after the persulfate has been decomposed; then add cold persulfate soln., allow the black ppt. to settle, filter and wash. With dil. solns. 1–2 hrs. standing with frequent shaking

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results in complete pptn. With exceedingly dil. solns. one must allow to stand overnight. Ignite in H, and weigh as metal. Results recorded are excellent.

E. G. R. ARDAGH.

Suggestions for Hastening Nitrogen Analysis. O. CLAASSEN. *Chem. Ztg.*, **35**, 1130–1.—By attention to the following points, the time of digestion may be cut down to 30 min. or less. The sample must be dry and finely ground. Mix 3 g. with 20 cc. conc. H_2SO_4, add 8 drops Hg, and then up to 5 g. Na_2SO_3. Heat the flask over a wire gauze (not asbestos). The flask should be so inclined that the heat is applied to the side and the flame should just touch the gauze. After 10 min. place the flask in the usual position, and continue the heating for about 20 min. One may cool quickly by an air blast or by cautiously adding a small piece of ice. Standardize the NaOH by titrating against known weights of NH_4Cl distilled with caustic and caught in standard H_2SO_4.

E. G. R. ARDAGH.

A New Volumetric Indicator. R. MELLET. *Mon. sci.*, **1**, II, 576–8; cf. *C. A.*, **5**, 48.—Tri-Na 6-sulfo-β-naphtholazo-*m*-hydroxybenzoate is used. Make up a 1% soln. and add 0.1 *N* HCl drop by drop till the color changes to red. In making titrations add plenty of the indicator. Advantages claimed: (1) Intense color (30 times that of litmus), (2) color change within closer limits than with other indicators, (3) extreme sensibility even for 0.1 *N* and 0.01 *N* solns., (4) equally effective either in titrating an acid with alkali or *vice versa*. Preparation: The hydrochloride of 4-amino-*m*-hydroxybenzoic acid, prepared by reducing 4-nitro-*m*-hydroxybenzoic acid with $SnCl_2$ and HCl (cf. *Ann.*, **311**, 43), is diazotized as follows: Dissolve 10 g. in a small amt. H_2O, add 10 cc. conc. HCl, cool with ice, and add drop by drop 25 cc. H_2O containing 3.8 g. $NaNO_2$. A fine yellow uncrystallizable powder (diazo-*m*-oxybenzoic acid), easily decomposed by warming or on exposure to even diffused light, is produced. The diazo compd. is copulated with β-naphthol sulfonic acid as follows: Allow the diazo compd. to stand 15 min. in its mother liquor, then pour it with constant stirring into 45 cc. of luke-warm 20% NaOH mixed with 11.2 g. Na-β-naphthol-6-sulfonate in sufficient water to dissolve it. Allow to stand 2 hrs. with occasional stirring. Pour into about 2.5 l. alc. and stir vigorously. In several min. the tri-Na sulfonate separates. Filter, wash first with alc., then with ether. The material is very sol. in water, with which it forms a blue-violet soln. which alkalies change to a cherry-red.

E. G. R. ARDAGH.

Simplified Method for the Analysis of Cuprous Iodide. H. BARDT. *Z. anal. Chem.*, **50**, 695–6.—The method consists in the extraction of the material with NH_4OH, electrolytic deposition of Cu in ammoniacal tartrate soln., and titration of I in the remaining soln. with $Na_2S_2O_3$ after addition of HCl. The Cu is dissolved in HNO_3, and redeposited in acid soln. Results of analysis of pure and com. Cu_2I_2 are given.

WILLIAM BLUM.

Rapid Electroanalysis. Stirring by Gas Bubbles. FRANZ FISCHER, CARL THIELE AND EMIL STECHER. Techn. Hochsch., Berlin. *Z. Elektrochem.*, **17**, 905.—A simple little app. is described for rapid detns. of Cu, Ni, etc. 150 cc. of electrolyte are contained in a large test tube, 4.5 cm. by 30 cm. The gas, usually H, is introduced into the soln. through a 5 mm. tube extending to the bottom of the test tube and terminating in a perforated glass bulb. The electrodes are Pt. High pressure H is used so as to bring about a very vigorous stirring. 0.13 g. Cu and 0.18 g. Ni were accurately detd. in 10 min.

L. K. MULLER.

Rapid Electroanalysis in a Partial Vacuum. F. FISCHER, C. THIELE AND E. STECHER. *Z. Elektrochem.*, **17**, 906.—The neck of the test tube described in the preceding abstr. is fitted with a rubber stopper and glass tube connected to a vacuum

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pump. The idea is to hasten the liberation of the gas bubbles from the anode (or cathode) and thereby bring about a mechanical stirring of the soln. In Cu detns. the rapid removal of the H bubbles in the last stages of the pptn. tends to shorten the time very considerably. The data for the Cu detn. are: 100 cc. soln., 0.1317 g. Cu, 1.5 cc. H_2SO_4, 70°, 8 v., 3 amp., 9 min. This method is cheaper than that described in above abstract. L. K. MULLER.

Time Curves for Cadmium Deposited from Organic Electrolytes. M. V. DOVER. *J. Am. Chem. Soc.*, 33, 1577–83.—A study of the electrolytic deposition of Cd from acetate, formate and lactate solns. WILLIAM BLUM.

Fluorine Determination. M. KLEINSTÜCK. *Z. anal. Chem.*, 50, 697.—For the prep. of the ammoniacal ZnO soln. used in Berzelius' method to remove SiO_2 from the soln. before pptg. CaF_2, the author recommends dissolving dry ZnO, as purchased, in NH_4OH and $N\dot{H}_4$ salts, or in $(NH_4)_2CO_3$ without NH_4OH; a procedure proposed by Berzelius, but overlooked in modern text-books. WILLIAM BLUM.

The Dichromate Iodide Method for Lead. R. T. WILDER. *Eng. Mining J.*, 92, 390.—The last sentence of the abstract in *C. A.*, 5, 3210 should not contain the phrase "in the ore." J. J. M.

The Evaluation of Graphite. F. MAYER. *Chem. Ztg.*, 35, 1024–5.—The character of the color, streak, etc., of graphite give no indication of its chem. comp. Generally the C content is detd. and the impurities which appear as ash. Physical properties are also noted such as d., fineness, etc., and it is customary, other things being equal, to give preference to the sample having the highest C content. The method of heating the graphite with an excess of PbO_2 and calculating the amt. of C from the wt. of the Pb regulus contains 3 sources of error: (1) There may be a volatilization of Pb; (2) small beads of Pb may remain distributed through the excess of PbO_2; (3) small amts. of CO may be formed. Heating with Na_2CO_3-K_2CO_3 mixt. and sepg. the SiO_2 by soln. in strong HCl is a poor method. It is necessary to use a stream of O and a high temp. to completely burn off the graphitic C and takes 4–6 hrs. The process may be hastened by mixing with an equal wt. of ignited Fe_2O_3. The results are high, as H_2O of constitution, CO_2 from carbonates, etc., are calculated as C. Hygroscopic H_2O may be detd. as loss in wt. at 110°. The most accurate method is to burn the material in a Berthelot bomb calorimeter, with an O pressure of 25 atms. and calculate the amt. of C from the heat of combustion. BzOH is added (0.6 g. graphite to 0.4 g. BzOH) to attain complete combustion. A correction is made for BzOH and S.
E. W. BOUGHTON.

Valuation of Graphite. J. GOLDSTEIN. *Chem. Ztg.*, 35, 1134.—Detn. of C in graphite can be carried out by oxidation with H_2SO_4 + CrO_3 in a Corleis flask more rapidly and simply than by any other method. No figures are given (see preceding abstr.) E. G. R. ARDAGH.

The Determination of Manganese as Manganous Oxide, Protosesquioxide and Sesquioxide. P. N. RAIKOW AND P. TISCHKOW. *Chem. Ztg.*, 35, 1013–5.—Mn is grav. detd. as oxide, sulfate, sulfide or pyrophosphate, usually as either of the first 2. There is disagreement as to the accuracy of the sulfate method, and the stability of the oxides upon heating. MnO is the last product of the reduction of the higher oxides at a red heat in a stream of H. The rapidity of the reduction increases with rise of temp. up to a certain point, but the complete reduction is dependent upon the force of the stream of H. If the stream be moderate, as is usually employed, on cooling, the surface of the MnO will be coated with higher oxides, but with a strong stream and a moderate heat the MnO is homogeneous and pale green. This is a convenient and accurate form in which to weigh Mn. Mn_2O_3 is not converted into Mn_3O_4 when heated in

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a Rose crucible over a Teclu burner, but by continued heating with the blast lamp Mn_2O_3 is completely converted to Mn_3O_4. The conversion is hastened if the contents of the crucible are stirred with a thick Pt rod. If Mn_2O_3 be heated over a blast lamp in a stream of CO_2, it is quant. converted into Mn_3O_4 in a few min. By strong heating in air, MnO is quant. converted to Mn_3O_4. If a temp. not sufficiently high is used, Mn_2O_3 is formed. Results of analyses are given, showing the quant. conversion of $MnSO_4$ and $MnCO_3$ into the different oxides, and these into each other.

E. W. BOUGHTON.

Important Features in the Technic of Carbon Dioxide Estimations in Air. E. W. BROWN. U. S. N. *U. S. Naval Med. Bull.*, 5, 457–9.—The method presents nothing new, being merely some variations in technic. An ingenious diagram to eliminate pressure and temp. calculations is given. A. V. DE LAPORTE.

Determination of Phosphorus in Milk. C. SLONIEWSKI. *Bull. soc. chim. belg.*, 25, 225–6; through *J. Soc. Chem. Ind.*, 30, 917.—In detg. P_2O_5 in the ash of milk, S. finds that provided the incineration is carried out below a dull red heat there is no appreciable loss of P. However, he prefers the oxidation method with HNO_3 as being simpler and quicker. He suggests that milk contains more P than previous results recorded would indicate, and points out a const. ratio existing between the quantities of P_2O_5 and ash, but not between the P_2O_5 and proteins of milk. This would seem to suggest that there is no P in casein. R. A. CUNNINGHAM.

Determination of Traces of Alcohol (KLÖCKER). 16. Congo Blue and Congo White (FAY, *et al.*). 25. Determination of Dust in Blast Furnace Gas (BRADY, TOUZALIN). 9. Analyses of Tobacco Juices (ESSNER). 12. Generation of Oxygen by Naphtha Products (KHARICHKOV). 22. Determination of Moisture (CRISFIELD). 1.

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8. MINERALOGICAL AND GEOLOGICAL CHEMISTRY.

ROGER C. WELLS.

Mineralogical Notes. W. T. SCHALLER. U. S. Geol. Survey, *Bull.* 490, 109 pp.—This collection of papers, Series 1, has appeared elsewhere with the exception of articles noted hereafter. R. C. WELLS.

Orbicular Gabbro from Pala, San Diego Co., Cal. W. T. SCHALLER. U. S. Geol. Survey, *Bull.* 490, 58–60.—These orbicules have no concentric structure but consist of olivine, largely altered, hypersthene, hornblende, feldspar and Fe oxides in pieces up to 2 in. in diameter and occur as residual loose pieces of a gabbro which has otherwise disappeared by weathering. R. C. WELLS.

Bibliography of North American Geology for 1910, with Subject Index. J. M. NICKLES. U. S. Geol. Survey, *Bull.* 495, 179 pp.—Includes lists of chem. analyses, descriptions of rocks, minerals and geologic formations which appeared in 1910.

R. C. W.

N. V. Ussing. O. B. BOGGILD. *Centr. Min.*, 1911, 529–30.—Biographical.

E. T. WHERRY.

The Refractive Index of Oil of Cinnamon. W. T. SCHALLER. U. S. Geol. Survey, *Bull.* 490, 60–4.—Although oil of cinnamon has been used for detg. *n.* of minerals it is unsuitable on account of the chem. instability of its chief constituent, cinnamic aldehyde. Its *n* increases on 5 min. exposure to the air about 0.004. The decrease per degree rise of temp. was found to be 0.00037. R. C. WELLS.

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Rubidium and Cesium Feldspars. V. VERNADSKII. *Bull. Acad. St. Petersburg*, 1911, 561–2; *Chem. Zentr.*, 1911, I, 1878.—V. exptd. with the prep. of the following silicates: $Rb_2Al_2Si_6O_{16}$ and $CS_2Al_2Si_6O_{16}$, in order to arrive at such products as are found in nature. A. A. KLEIN.

Nemalite and its Occurrence in Russia. A. FERSMANN. *Bull. Acad. St. Petersburg*, 1911, 539–56; *Chem. Zentr.*, 1911, I, 1879.—F. considers nemalite and brucite as 2 different polymorphous modifications of $Mg(OH)_2$. 2 varieties of nemalite can be distinguished: (1) Nemalite proper (in Jakutsk district) and (2) ferronemalite, containing 5% FeO (on northern slope of the Caucasus and in Transcaucasus).
A. A. KLEIN.

The Water Content of Kaolinite. I. SAMOYLOV. *Bull. Acad. St. Petersburg*, 1909, 1137–52; *Chem. Zentr.*, 1910, I, 470.—The structure of kaolinite and the way in which the H_2O is held therein is considered. S. used a kaolinite which analyzed as follows: SiO_2 46.51%, Al_2O_3 39.45%, H_2O 14.10%. It was heated in an elec. oven. From 105° to 325° only 0.13% H_2O was driven out; from 325° to 775° the loss of H_2O was detd. at every 25° rise. The loss of H_2O when plotted showed that almost all the H_2O was driven out between 450° and 550°. A. A. KLEIN.

Apparatus for Investigation of the Sensitiveness of Minerals to Electric Waves. G. SCHEIBT. Berlin. *Centr. Min.*, 1911, 588–92, 614–22. E. T. WHERRY.

The Nomenclature of Crystallography. PAUL SAUREL. *Physic. Rev.*, 34, 203–7.—S proposes a set of new names and symbols to characterize types of symmetry.
H. E. MERWIN.

Artificial Production of Nesquehonite. GUISEPPE CESÀRO. *Bull. acad. roy. belg.*, 1910, 844–5; cf. *C. A.*, 5, 1729.—A soln. of $NaHCO_3$ and $MgCl_2$ exposed to low temp. contained, the next day, small, transparent crystals of lansfordite, $MgCO_3.5H_2O$, together with cryst. globules composed of fine needles having the optical characters of nesquehonite, $MgCO_3.3H_2O$. This shows that the simultaneous formation of these two substances depends on low temp. and not on pressure. I. K. PHELPS.

Application of the Uranium and Lead Content of some Minerals to the Determination of the Age of the Rocks Containing them. FERRUCIO ZAMBONINI. *Atti accad. Lincei*, 20, II, 131–8.—Z. points out the wide variations in the supposed ages of rocks obtained by applying the Boltwood-Strutt method to them and the impossibility of such a geological chronology as Holmes (*C. A.*, 5, 3394) has attempted to work out. The reasons for this are 3-fold: The Strutt formula requires an accuracy in the detn. of the ratio Pb : U, which it is impossible to attain at present; it demands that the minerals investigated be the primary constituents of the rocks and that they shall not have undergone any other modification in comp. than that due to at. disintegration; and, finally, it is based on the assumption that the Pb is formed *exclusively* by the disintegration of U, an assumption by no means borne out by the facts.
C. A. ROUILLER.

Cathode Luminescence in Minerals. A. POCHETTINO. Ist. fis. univ. Sassari. *Nuovo cim.*, [6] 1, I, 21–64; cf. *Ibid.*, [5] 18 (Oct.).—Description of the behavior, when exposed to cathode rays, of natural and artificial willemite, phenacite, beryl, anatase, zircon, calcite, corundum, spodumene, orthoclase, disthene, cassiterite, wollastonite and milarite; in general the natural and artificial products show entirely analogous behavior. In general, the assumption of Nichols and Merritt, that the spectral constitution of the luminescence emitted under the action of cathode rays is independent of the velocity of the latter, does not seem to be correct. Twinned crystals generally show a less polarized luminescence than simple crystals of the same substance. The phenomena of dichroism in cathodo-luminescence are produced by the different degrees of

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polarization of the radiations constituting the spectrum of the emitted light and are certainly due to extraneous substances present in the mineral in small amts. Double luminescence has been found in spodumene, kunzite, disthene and orthoclase. The centers emitting light are in general uniformly distributed, although in certain varieties of cathodophosphorescent minerals, they are arranged in small groups clearly distinct from each other. The briefer the excitation, the briefer the residual luminescence; in general, the dampening of the light vibrations is greater for the radiations corresponding to the shorter wave lengths. In disthene, the lights emitted by photophosphorescence and cathodoluminescence. resp., under a not too intense excitation, besides being of different color, are also partially polarized at a right angle. C. A. R.

Synthesis and Manufacture of Precious Stones. PIERO FENAROLI. Lab. priv., Milano. *Ind. chim.*, 11, 149–52.—Brief description of the process for the synthetic prep. of rubies. If properly carried out, it yields a product which cannot be distinguished from the natural stone. From 1902–09, 5 millions of carats have been made.
CHAS. A. ROUILLER.

Synthetic Rubies. ANON. *Mining Sci. Press*, 102, 821.—A description of the Verneuil method of preparing artificial rubies from either fragments of the natural mineral or amorphous Al_2O_3 by slowly dropping the material upon a Pt disk heated in an oxyhydrogen flame. EDW. WOLESENSKY.

A Rhodonite Crystal from Franklin, N. J. W. E. FORD AND R. D. CRAWFORD. *Am. J. Sci.*, 32, 289–90.—Crystallographic data and drawings are given. Results show a new face v(0$\bar{4}$1) and one k(2$\bar{2}$1) which had been listed as a doubtful form.
A. A. KLEIN.

A Brookite Crystal from Bahia, Brazil. W. E. FORD AND FREEMAN WARD. *Am. J. Sci.*, 32, 290.—The crystal is complex. On it were identified 11 different forms. Drawings are given. A. A. KLEIN.

Some Analysis of Stibiotantalite. W. E. FORD. *Am. J. Sci.*, 32, 287–8.—Samples of sp. gr. 5.98, 6.72 and 6.80, resp., show the following resp. comp.: Ta_2O_5, 13.00, 33.86, 41.92; Nb_2O_3, 37.30, 21.47, 16.19; Sb_2O_3, 49.28, 44.26, 40.95; Bi_2O_3, 0.53, 0.33, 0.60. Foote and Langley (*C. A.*, 5, 846) find that the oxides apparently form a solid soln. with each other and do not exist together simply as a mechanical mixt.
A. A. KLEIN.

Crystallographic Examination of some Silicides, Carbides and Borides. A. DE SCHULTEN. *Compt. rend.*, 152, 1107–8.—*Silicides:* SiFe, cubic, hextetrahedral, consists of tetrahedrons elongated parallel to the binary axes; SiCo, cubic, hextetrahedral, crystals consist of rhombic dodecahedrons + tetrahedrons; SiMn, cubic, hextetrahedral; $SiCr_2$, very brilliant steel-gray hexagonal prisms, terminated by pyrimids; Si_2Fe, brilliant, iron-gray lamellas, very fine, formed by an aggregate of crystals with square contours; $SiMn_2$, very brilliant prisms with angles of 60° or thereabouts and without distinct terminations; Si_2Cr_3, long prisms with angles of 90°, no distinct faces can be observed at the extremities of the prisms. *Carbides:* C_3Al_4, small, flat rhombohedrons, yellow in color with rhombohedral cleavage, crystals are uniaxial, positive; CGl_2, brilliant yellow, regular octahedrons. *Borides:* $CaBO_6$, brilliant iron-gray, cubic crystals, no other faces observed; $BaBo_6$, same as $CaBo_6$; $SrBo_6$, cubic crystals, with not so high a luster as $BaBo_6$ and $CaBo_6$. A. A. KLEIN.

Some Herderite Crystals from Auburn, Maine. W. E. FORD. *Am. J. Sci.*, 32, 283–6.—Herderite is a rare fluophosphate of Be and Ca with the formula $Ca[Be(F, OH)]PO_4$, in which the F is replaced by OH. Individual and twinned crystals from the above locality show unmistakable monoclinic symmetry. Drawings and gonio-

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metric measurements of the angles are given, as well as the values of the calc. angles. A. A. KLEIN.

Action of Cathode Rays on some Minerals and the Nature of Mineral Colors. C. DOELTER. *Monatsh.*, 32, 299–318; cf. *C. A.*, 3, 747, 2105; 5, 246.—Rock salt, sylvite, corundum, zircon, ruby, topaz, kunzite, and barite were subjected to cathode rays and the change in color observed. The effect of heating on these colors was noted and compared with the effect on the naturally colored specimens. The colors of many minerals are probably caused by the presence of radioactive substances. Among these minerals are sapphire, fluorite, halite, barite, celestite, apatite, calcite, quartz, zircon, spodumene, kunzite, topaz, rutile, boracite in part, and diamond in a small degree. The β and γ rays are most active in the coloring of minerals. Mineral colors may be divided according to origin into (1) idiochromatic, (2) those produced by the soln. of colored ingredients, and (3) those produced by Ra and other colored rays, originally colorless. A. A. KLEIN.

Chemical Composition of Nephelite. W. T. SCHALLER. *J. Wash. Acad. Sci.*, 1, 109–12.—Nephelite as an isomorphous mixt. of the compds. crystg. in the hexagonal modification, which are: (1) $AlNaSiO_4$ (essential component); it has been artificially prepared; (2) $AlKSiO_4$ kaliophillite; (3) $AlNaSi_3O_8$, best known in triclinic form as albite. A. A. KLEIN.

Alunite-Beaudantite Group. W. T. SCHALLER. *J. Wash. Acad. Sci.*, 1, 112–3.—Minerals in this group may be subdivided into sulfates, phosphates and sulfate-phosphates, the formulas being, resp.: $[R'''(OH)_2]_6.R''.(SO_4)_2.(SO_4)_2$; $[R'''(OH)_2]_6.R''.[HPO_4]_2.[R''(PO_4).{}_2]$ and $[R'''(OH)_2]_6.R''.(SO_4)_2.[R''(PO_4)_2]$. A. A. KLEIN.

Relations of Purpurite and Heterosite. W. T. SCHALLER. *J. Wash. Acad. Sci.*, 1, 113.—Purpurite, which according to Lacroix is identical with heterosite, is a hydrous manganic phosphate with the formula $(Mn,Fe)_2O_3.P_2O_5.H_2O$. S. suggests that the name "heterosite" be restricted to the ferric phosphate, and "purpurite" to the manganic phosphate. A. A. KLEIN.

The Occurrence of Bertrandite at the Cheesewring Quarry, near Liskeard, Cornwall. H. L. BOWMAN. *Min. Mag.*, 16 47–51.—The crystals are all tabular, usually rhombic in outline, although 6-sided or oblong plates are occasionally observed. n_D equals; $\alpha = 1.584$, $\beta = 1.603$, $\gamma = 1.611$. The true optic axial angle is $2V = 73°$. The crystals are strongly pyroelec. D. = 2.604. It occurs on the sides of nearly vertical joints which traverse granit, and is usually associated with fluorite, anatase, wolframite, torbernite, and is frequently penetrated by needles of greenish tourmaline. In this locality bertrandite does not appear to be associated with beryl, from which mineral it has usually been considered to be derived. W. F. HUNT.

The Occurrence of Phenacite in Cornwall. ARTHUR RUSSELL. *Min. Mag.*, 16, 55–63.—This mineral has not previously been recorded from the British Isles. The article contains an account of its characters and mode of occurrence at 5 distinct localities in Cornwall. W. F. HUNT.

The Natural History of Kaolinite. FRANCIS H. BUTLER. *Min. Mag.*, 16, 63–71; cf. *C. A.*, 3, 2107.—Kaolinite was found in the southwest coal field of east Glamorganshire. Kaolinization of the feldspar of the rocks of the coal field was the work of CO_2 in soln., that gas being a const. emanation from the coal seams and carbonaceous shales. The existence of dolomite and calcite in the fissured grits is sufficient evidence that the water carried CO_2. The reaction involved might be expressed as follows: $K_2Al_2Si_6O_{16} + H_2CO_3 = H_2Al_2Si_6O_{16} + K_2CO_3$. The alumohexasilicic acid, breaking up, yields kaolinite and silica. The K_2CO_3 in the presence of the kaolinite or alumodisilicic acid, produces mucovite, water, and CO_2. CO_2 acts as the carrier of the

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alkali metal and that portion which is not removed in soln. is free to act upon the orthoclase. Thus granted a sufficient time a comparatively small proportion of CO_2 is required for the conversion of vast quantities of feldspar into a mixt. of kaolin and muscovite. W. F. HUNT.

Fichtelite of Kolbermoor and Wunsiedel in Bavaria. ARISTIDE ROSATI. *Atti accad. Lincei*, 20, II, 212–17; cf. *C. A.*, 5, 2057.—In addition to the data already reported in the earlier article a comparative table of the crystallographic consts. obtained by different authors is given. CHAS. A. ROUILLER.

Petrographic Study of the Dioritic Rocks from the Veltlin Gabbro Region. WALTHER RASCH. Jena. *Neues Jahrb. Min. Geol.* (*Beil. Bd.*), 32, 197–238.—Includes analyses of tonalite-granit, diorite, and norite. E. T. WHERRY.

Barite Crystals from Birkenau, Crystallin Odenwald. M. HENGLEIN. Karlsruhe. *Centr. Min.*, 1911, 580.—Crystals of barite found in fissures in granit showed double phantom effect. They were probably formed by decomp. of Ba-bearing silicates by S-bearing H_2O. E. T. WHERRY.

Crystallographic Contributions on Barite from the Freiberg District. M. HENGLEIN. Karlsruhe. *Neues Jahrb. Min. Geol.* (*Beil. Bd.*), 32, 71–100.—Complete angle tables are given for the 100 certain and 81 doubtful forms of this mineral. E. T. W.

Two Generations of Andalusite in the Lake Laach Crystallin Schists. R. BRAUNS. Min. Inst., Univ. Bonn. *Neues Jahrb. Min. Geol.*, 1911, II, 1–10.—Metamorphism by alk. magmas early developed andalustite in the sediments of the region, but the continuance of the action altered it to mica, and folded it along with the strata. A second advance of the magma later produced another generation of the mineral, which can be distinguished by its freshness and lack of pressure effects. E. T. WHERRY.

Cordierite-Pinite from Düllenberg, East Bavaria. H. LAUBMANN AND A. CATHREIN. Min.-petr. Inst., Univ. Innsbruck. *Neues Jahrb. Min. Geol.*, 1911, II, 11–9.—Specimens from this locality, heretofore regarded as andalusite, prove to be pinite, pseudomorphous after cordierite. E. T. WHERRY.

Interference Phenomena in Plates of Optically Active Isotropic Crystals. PAUL KAMMERER. Dresden. *Neues Jahrb. Min. Geol.*, 1911, II, 20–9.—$NaClO_3$ shows peculiar spirally arranged interference figures in convergent polarized light. E. T. WHERRY.

Studies on Deformation in Mimetic Crystals. PAUL FISCHER. Göttingen. *Neues Jahrb. Min. Geol.* (*Beil. Bd.*), 32, 1–48.—The action of pressure on crystals of $(NH_4)_2SO_4$, $(NH_4)_3H(SO_4)_2$, $K_3H(SO_4)_2$ and $KClO_3$ produced twinning lamellas, tending toward the development of higher symmetry. In the last a remarkable series of gliding planes was found to exist. E. T. WHERRY.

The Foundation of a New Theory of Crystal Structure. A. NOLD, DIEZ AND LAHN. *Z. Kryst. Min.*, 48, 321–76. E. S. LARSEN.

Crystallization on Spheres as a Special Method of Crystallographic Study. D. N. ARTEMAEV. St. Petersburg. *Z. Kryst. Min.*, 48, 417–33.—A sphere from a NaCl crystal was immersed in a satd. soln. of NaCl in pure water and in other solns., and the crystals forms developed on the sphere were studied. Several other salts were studied in the same manner. E. S. LARSEN.

The Isomorphism and Polymorphism of Mercuric Iodide, Bromide and Chloride. V. I. LUCZIZKII. Kiev. *Bull. der Ges. d. Naturforscher in Kiew*, 20, (*lief* 2), 191–207; through *Z. Kryst. Min.*, 46, 297–8.—Isomorphous mixed crystals of HgI_2 and $HgBr_2$ were formed in part from cooling solns. in alc. and in part from water solns. HgI, is miscible with the $HgBr_2$ only up to the proportion of about 3 of $HgBr_2$ to 2 of HgI_2.

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The axial ratios for different comps. are: $HgBr_2$, $a : b : c = 0.6826 : 1 : 1.7952$; $5HgBr_2.2HgI_2$, $a : b : c = 0.6724 : 1$; $2HgBr_2.HgI_2$, $a : b : c = 0.6782 : 1 : 1.7878$; undetd. comp., $a : b : c = 0.6443 : 1 : 1.8384$; $HgI_2 = 0.6494 : 1$. Mixed crystals of $HgCl_2$, and $HgBr_2$ were formed but the amts. were too small for chem. analysis. Where the mol. proportions in the soln. were $4HgCl_2$ to $1HgBr_2$, $a : b = 0.7155 : 1$; $4HgCl_2$ to $2HgBr_2$, $a : b = 0.7131 : 1$; $4HgCl_2$ to $3HgBr_2$, $a : b = 0.7076 : 1$; $HgCl_2$, $a : b : c = 0.7251 : 1 : 1.0697$. Crystals from a soln. containing equal mol. proportions of $HgBr_2$ and $HgCl_2$ gave crystals with $a : b : c = 0.5213 : 1 : 1.1546$. They are probably crystals of a double salt. In the following table the stable modification is marked with a asterisk.

	HgI_2.	$HgBr_2$.	$HgCl_2$.
First modification.....	*Tetragonal	.....	.....
Second.....	Orthorhombic	*Orthorhombic α	Orthorhombic β
Third.....	.....	Orthorhombic β	*Orthorhombic α

E. S. LARSEN.

Pneumatolitic Hornblende from Mont Dore, Department of Puy-de-Dome, France. F. N. GUILD. Tucson, Arizona. *Z. Kryst. Min.*, 48, 449–51.—A crystallographic study of a hornblende. E. S. LARSEN.

The Crystal Form of Microcline. O. B. BÖGGILD. Copenhagen. *Z. Kryst. Min.*, 48, 466–72. E. S. L.

Hambergite from Madagascar. V. GOLDSCHMIDT, Heidelberg, AND FRDR. C. MILLER. Basel. *Z. Kryst. Min.*, 48, 473–83.—From the measurement of 5 good crystals the authors give the axial ratios of this orthorhombic mineral as $a : b : c = 0.8023 : 1 : 0.7268$. n_D equals $\alpha = 1.5542$, $\beta = 1.5885$, $\gamma = 1.6285$, $2V_{Na} = 87° 17.4'$, $\rho < \nu$ slight. The mineral is optically + and $a = X$, $c = Z$. E. S. L.

Contribution to the Knowledge of the Minerals of the Pyrite and Marcasite Groups. VIKTOR PÖSCHL. Graz. *Z. Kryst. Min.*, 48, 572–618.—Pyrite is somewhat harder than marcasite. The hardness of any surface of these minerals does not depend on the direction of scratching and there is no apparent difference in the hardness for different surfaces. E. S. LARSEN.

The Chemical Constitution of Pyrite and of Manganese Dioxide. L. BENEDEK. Budapest. *Magyar. Chem. Folyoirat.*, 14, 85–8; through *Z. Kryst. Min.*, 48, 447–8.—Pyrite, when heated in a stream of CO_2 at a red heat, loses half its S. When heated in water vapor at 300–400° FeO results. Since no reduction can follow from the chem. inversion or from the dissociation of a ferric compd., pyrite must be a ferrous compd. oversatd. with S, which on heating gives up S and leaves the FeS. Likewise, MnO_2, heated in H, first gives Mn_2O_3, at 280° Mn_3O_4, and finally MnO. MnO_2 in a compd. oversatd. with O and probably a triple compd. of MnO_2; according to Elliott and Storer it is $Mn_2O_3.MnO_2$. E. S. LARSEN.

The Development of Tridymite and Cristabolite in Quartz Bricks. P. J. HOLMQUIST. *Geol. Fören. Stockholm Förhandl.*, 33, 245–60.—The quartz of Dinas brick after use in a Martin oven is changed to tridymite. The tridymite is not formed directly from the quartz but a glassy state intervenes. When the bricks are subjected to a very high temp. and are partly molten, cristabolite results. The great expansion of quartz brick after use in the oven is ascribed to this inversion of the quartz to tridymite. E. S. LARSEN.

Datolite. H. UNGEMACH. *Z. Kryst. Min.*, 49, 459–76. E. S. L.

Niccolite from Riechelsdorf. V. DÜRRFELD. Strassburg i/Els. *Z. Kryst.*

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Min., 49, 477–9.—Crystals of niccolite showed the forms {10$\bar{1}$0}, {17$\bar{8}$0}, {30$\bar{3}$4}, {03$\bar{3}$4}, {90$\bar{9}$2}, {09$\bar{9}$2}, {03$\bar{3}$2}. E. S. LARSEN.

Niccolite from Freiberg i. S. V. DÜRRFELD. *Z. Kryst. Min.*, 49, 480. E. S. L.

Heulandite from Oberstein. V. DÜRRFELD. *Z. Kryst. Min.*, 49, 480–1. E. S. L.

Additional Notes on Cassiterite. J. H. COLLINS. *Min. Mag.*, 16, 30–5 (2 plates with 14 photographs).—C. concludes that the following takes place: (1) The deposition in successive layers of amorphous, perhaps colloidal cassiterite, which is usually very ferruginous; (2) the gradual development of a radial cryst. structure; (3) the formation of distinct crystals of cassiterite, quartz, tourmaline, chlorite, and other minerals in the shrinkage cracks which result from the smaller space occupied by the cryst. as compared with the colloidal cassiterite. W. F. HUNT.

The Composition of a Stone from the Meteoric Shower which Fell at Dokachi, Bengal, on October 22, 1903. H. E. CLARKE AND H. L. BOWMAN. *Min. Mag.*, 16, 35–47.—The stone examd. weighed 17.79 g. A thin section under the microscope revealed the matrix to be a rather finely granular mixt. of olivine and bronzite, with irregular grains of Ni–Fe and traces of troilite. Chondrules are present, though not numerous. These are mostly granular or porphyritic olivine; a few, however, are composed of radial-fibrous bronzite. The method of analysis is given in detail. The general comp. may be expressed as follows: Ni–Fe 18.66% (Fe 17.45, Ni 1.03, Co 0.18), magnetite 1.11, troilite 4.10, schreibersite 0.17, chromite 0.05, silicates attacked (largely olivine) 37.71, unattacked (largely pyroxene) 37.93, total, 99.73. W. F. HUNT.

Some Swiss Glaucophane Rocks. U. GRUBENMANN. Zurich. *Festschra von H. Rosenbusch, Stutgart*, 1906, 1–24.—*A.* (1) The carbonate rich glaucophane rocks from Val de Bagne have a crystalloblastic texture. The crystalloblastic series is: Rutile, titanite-glaucophane-epidote, apatite-ores-mica, chlorite-calcite, quartz-albite. An analysis by L. Hezner gave: SiO_2 33.40, TiO_2 5.54, Al_2O_3 8.36, Fe_2O_3 7.82, FeO 7.37, CaO 13.99, MgO 7.84, K_2O 1.16, Na_2O 1.98, H_2O (—100°) 0.10, ignition loss 3.40, CO_2 8.80, total 99.76. D. = 2.94. (2) The chlorite-epidote-glaucophane rocks from Val de Bagne are dark blue-green or green-blue and are only slightly banded. The components are: Chlorite, epidote, glaucophane, muscovite, calcite, sometimes quartz and albite, and accessory titanite, ores, garnit, etc. Analysis: SiO_2 45.96, TiO_2 4.68, Al_2O_3 12.77, Fe_2O_3 6.00, FeO 8.14, CaO 5.99, MgO 4.87, K_2O 0.98, Na_2O 6.06, H_2O (—100°) 0.07, ignition loss 3.42, CO_2 1.37, total 100.31. D. = 2.94. (3) The glaucophane-muscovite schist from the same district show the following crystalloblastic series: Titanite, rutile-tourmaline-glaucophane-ores, epidote-muscovite, chlorite-quartz-carbonate, albite. The analysis gave: SiO_2 47.95, TiO_2 4.28, Al_2O_3 14.10, Fe_2O_3 8.59, FeO 4.95, CaO 4.38, MgO 4.24, K_2O 4.14, Na_2O 3.97, H_2O (—100°) 0.08, ignition loss 3.29, total 99.95. D. = 2.95. Analysis of the glaucophane from this rock: SiO_2 52.76, TiO_2 0.94, Al_2O_3 6.80, FeO_3 10.38, FeO 8.45, CaO 2.25, MgO 9.38, K_2O 1.11, Na_2O 7.20, H_2O (—100°) 0.08, ignition loss 0.44, total 99.79. D. = 3.155. (4) The glaucophane gneiss from the same district has a mixed crystalloblastic and catablastic texture and shows washed grains of quartz. The crystalloblastic series is: Titanite-magnetite, glaucophane-tourmaline-garnet-epidote-mica, chlorite-quartz-albite. Analysis SiO_2 61.68, TiO_2 1.43, Al_2O_3 17.28, Fe_2O_3 2.77, FeO 3.96, CaO 0.91, MgO 1.90, K_2O 3.94, Na_2O 3.23, H_2O (—100°) 0.08, ignition loss 3.00, total 100.18. D. = 2.83. The glaucophane rocks from Val de Bagne were recrystallized at no great depth and are derived from eruptive rocks of a theralitic nature or their tuffs. The tuffs were somewhat mixed with sedimentary material of a calcareous or clayey and sandy nature. The glaucophane was derived from the augite thus:

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Na-bearing augite + water = glaucophane + chlorite + quartz.

$$\left\{\begin{matrix}6MgSiO_3\\2CaSiO_3\\MgAl_2SiO_6\\2NaAlSi_2O_6\end{matrix}\right\} + 4H_2O = \left\{\begin{matrix}Mg_3Ca_2Si_4O_{12}\\Na_2Al_2Si_4O_{12}\end{matrix}\right\} + \left\{\begin{matrix}Si_4O_9Mg_3H_4\\SiO_9Al_2Mg_2H_4\end{matrix}\right\} + 2SiO_2$$

B. Erratics from the Canton Bern. (1) A glaucophane-chlorite schist from Langnau is a dark blue-green, fine-grained rock, with chlorite, glaucophane epidote, actinolite, titanite and muscovite. An analysis gave: SiO_2 46.25, TiO_2 3.52, Al_2O_3 12.72, FeO_2 4.30, FeO 9.04, CaO 6.59, MgO 8.42, K_2O 0.86, Na_2O 4.58, H_2O (—100°) 0.14, ignition loss 3.56, total 99.98. D. = 3.06. (2) A glaucophane eclogite from Lüscherz has a porphyroblastic texture with a ground mass partly diablastiastic and partly granoblastic. It shows the following crystalloblastic series: Rutile-garnet, ores-omphacite, glaucophane-hornblende-quartz. The analysis is: SiO_2 44.31, TiO_2 6.38, Al_2O_3 12.68, Fe_2O_3 9.83, FeO 8.72, CaO 9.54, MgO 3.42, K_2O 0.82, Na_2O 3.60, H_2O (—100°) 0.02, ignition loss 0.94, total 100.26. D. = 3.46. E. S. Larsen.

Petrological Study of some Rocks from the Hill Tracts, Vizagapatam District, Madras Presidency. T. L. Walker and W. H. Collins. *Records Geol. Survey India*, 36, 1–18.—The occurrence of the India sapphirine rocks is practically identical with that of fiskernäs in Greenland. They appear to be the result of the mingling and subsequent metamorphism of ultra-basic igneous borders and very aluminous paraschists rich in sillimanite. An ultra-basic, spinel-bearing rock from near Panasput, near the contact between charnokite and khondolites, is a massive black rock with a d. of 4.02 and resembling a magnetic Fe-ore in the hand specimen. It consists of green spinel and magnetite with accessory quantities of biotite, sapphirine, and a few grain of a colorless highly refracting mineral, possibly corrundum. Analysis by Colins. SiO_2 3.60, TiO_2 4.57, Al_2O_3 45.97, Fe_2O_3 + FeO 40.23, MgO 7.36, CaO 0.92, total 102.65: A sillimanite schist is almost pure, well crystallized sillimanite. Intermediate rocks rich in sapphirine and spinel were derived from the absorption of the sillimanite schist by the charnockite magma. They are made up largely of sapphirine, some spinel, biotite, and magnetite, and a little sillimanite. An analysis gave: SiO_2 35.90, Al_2O_3 32.91, Fe_2O_3 + FeO 9.16, MgO 2.40, H_2O 0.60, MnO 0.40, total 100.37. The sapphirine is deep blue with pleochroism in navy and Berlin tints. It is monoclinic and has an extinction angle of 15°, $X\Lambda a$. The plane of the optic axis is the plane of symmetry. D. = 3.542. An analysis gave: SiO_2 14.56, Al_2O_3 60.49, Fe_2O_3 + FeO 7.65, MgO 17.13, loss 0.56, total 100.39. Analysis of the deep green spinel from this rock gave: SiO_2 0.10, TiO_2 none, Al_2O_3 65.02, Fe_2O_3 + FeO 22.02, CaO trace, MgO 13.16, MnO trace, total 100.30. Rocks free from both spinel and sapphirine are made up of sillimanite, cordierite, biotite, and hypersthene. The av. analysis of the hypersthene, which shows inclined extinction, gave: SiO_2 49.77, Al_2O_3 13.18, FeO 10.73, MnO 0.40, CaO trace, MgO 27.86, loss 0.16, total 102.09. D. = 3.386. Intermediate rocks free from sapphirine but containing spinel consist of a considerable proportion of spinel with sillimanite, cordierite, biotite, magnetite and sometimes hypersthene. Their d. is about 3.16. E. S. Larsen.

The Occurrence of Isolated Augite Crystals at the Top of the Permo-carboniferous Upper Marine Mudstones at Gerringong, N. S. Wales. H. G. Foxall. *J. Roy. Soc. N. S. Wales*, 38, 402–5.—The crystal forms of the isolated augite crystals are given: Analysis: SiO_2 47.21, Al_2O_3 11.12, Fe_2O_3 5.50, FeO 5.11, MgO 8.97, CaO 19.73, Na_2O abs., K_2O abs., H_2O(100°) 0.41, H_2O (+100°) 1.25, TiO_2 0.79, Cr_2O_3 0.13, MnO 0.29, total 100.51. E. S. Larsen.

Contribution to the Knowledge of the Chemical Constitution and the Genesis of

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the Natural Ferric Sulfates. VII. The Ihleite and Janosite Question. RUDOLF SCHARIZER. Czernowitz. *Z. Kryst. Min.*, 46, 427–53.—Since the different ferric sulfates are unequally sol. in alc. it can be used to test their purity. α-Copiapite has the formula $Fe_4S_3O_{22}$ + $18H_2O$ or $(HO)_2Fe_4(SO_4)_5$ + $17H_2O$. β-Copiapite, $(HO)Fe_3(SO_4)_4$ + $13H_2O$. Studies with acetone indicate that all the ferric sulfate solns. are hydrolytically dissociated as follows: Solns. of ferric tetrasulfate $[Fe_2S_4O_{15}]$ into $Fe_2S_3O_{12}$ and H_2SO_4; solns. of ferric trisulfate $[Fe_2S_3O_{12}]$ into $(HO)Fe_3(SO_4)_4$ and H_2SO_4 and solns. of β-copiapite $(HO)Fe_3(SO_4)_4$ into $(HO)_2Fe_4(SO_4)_5$ and H_2SO_4. The condition of the mol. of the ferric sulfate in a conc. soln. depends upon the ratio of the hydrolytically dissociated ferric sulfate to that bound with H_2SO_4 and when this exponent reaches $^1/_{14}$ only α-copiatite exists in the soln. when $^1/_8$ only β-copiotic, and when $^1/_3$ only coquimbite. When the exponent approaches 1 ferric sulfate can exist in the soln. When the free H_2SO_4 has a conc. of H_2SO_4 + 6.35 aq., only ferric tetrasulfate seps. When the conc. is less than H_2SO_4 + 7.25 aq. only coquimbite seps. A soln. of $Fe_2S_3O_{12}$ + aq. ppts. at first only copiapite but after most of the Fe has been pptd. the conc. of free H_2SO_4 reaches such a point that a part of the copiapite is changed to coquimbite and ferric tetrasulfate. The study showed no indication of a janosite-like compd. and it is probable that ihleite has no mineralogical existence.

E. S. LARSEN.

Indium and Thallium in Crystallographic Relations. A Study of Isomorphism. R. C. WALLACE. Winnipeg, Canada. *Z. Kryst. Min.*, 49, 417–54 (*A*).—The series $R_3MX_6.2H_2O$(R = K, NH_4, Rb; M = Tl, In; and X = Cl, Br) crystallize in the ditetragonal bipyramidal class. (1) Crystallographic data are given for $(NH_4)_3TlCl_6.2H_2O$, $K_3TlCl_6.2H_2O$, $K_3InCl_6.2H_2O$, Rb_3TlBr_6, and $K_3InBr_6.2H_2O$. (*B*) The series $R_2M_5.H_2O$ crystallize in the orthorhombic bipyramidal class. Crystallographic data for $Rb_2TlCl_5.H_2O$, $Cs_2TlCl_5.H_2O$, $(NH_4)_2InCl_5.H_2O$, $Rb_2InCl_5.H_2O$, $Cs_2InCl_5.H_2O$, $(NH_4)_2InBr_5.H_2O$, $Rb_2InBr_5.H_2O$, and $Cs_2InBr_5.H_2O$ are included. (*C*) $RTlBr_4.H_2O$, where R = Rb, Cs, K or NH_4, crystallizes in cubes. $K_2Tl_2Br_9.3H_2O$ belongs to the bipyramidal class. (*D*) From a study the isomorphic relations of the above crystals and of the isomorphous salts $K_2FeCl_5.H_2O$ and $(NH_4)_2FeCl_5.H_2O$, W. reaches the following conclusions: (*a*) Crystal habit. The alkalies form the series: (NH_4), Rb, Cs; Cl and Br salts are very closely related. Salts of Fe, In, and Tl are very different. (*b*) Interfacial angles. The alkalies form the series: Rb, (NH_4), Cs; NH_4 and Rb salts are very close together. The intervals Cl-Br and Rb-Cs are equally great. The greatest change takes place by substituting within the group Fe, In, Tl; the change is approx. proportional to the change in at. wt. (*c*) As regards mol. vol. and relative mol. spacing, the alkalies form the series: K, (NH_4), Rb, Cs, wherein (NH_4) is near Rb. Substitution influences chiefly the χ and ψ values. Substituting within the group Fe, In, and Tl influences chiefly the ω value and that only slightly. In and Tl are more closely related than Fe and In. The substitution of Br for Cl changes all 3 axes about alike and indicates that the halogen atom is symmetrically placed in the molecule.

E. S. LARSEN.

Pitchstone from Meissen and Felsite Porphry from Dobritz. O. STÜTZER. Belgian Congo. *Z. deut. geol. Ges.* (*Monatsb.*), 1911, 361–2.—Replying to Sauer (*C. A.*, 5, 2385), S. finds no reason to alter his former opinions as to the origin of these rocks (*C. A.*, 5, 1248). E. T. WHERRY.

Transformations and Chemical Reactions Applied to Measurement of the Temperature of Geologic Processes. JOHANN KOENIGSBERGER. Freiburg. *Neues Jahrb. Min. Geol.* (*Beil. Bd.*), 32, 101–33.—Consideration of the dissociation temp. of $CaCO_3$ indicates that some magmas have solidified above, others well below, 1000°. While the transformation of α into β quartz is apparently at a definit point, the tridymite

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and cristobalite forms of SiO_2 and the 3 of TiO_2 often crystallize from soln. simultaneously, physical and chem. influences being evidently of more significance for their development than temp. In general, the smaller the physical or chem. distinctions between the modifications of a substance, the more exactly do its stability and its existence fields fall together, and the more suitable is its transition point for geologic temp. detn. The converse is equally true. E. T. WHERRY.

Diagenetic Deformation of Salt Beds. R. LACHMANN. Breslau. *Centr. Min.*, 1911, 534–6.—In reply to Andrée (*Sitzb. Ges. Naturw. Marburg*, 1911, 1–8) it is contended that deformations in Mg-bearing salt deposits have been produced by chem. rearrangement, due to the limited range of stability of compds. like kieserite, rather than by tectonic action. E. T. WHERRY.

Experiments on the Recrystallization of Rocks in the Solid Condition. F. LOEVINSON-LESSING. Polytechn. Inst., St. Petersburg. *Centr. Min.*, 1911, 607–14.—Specimens of pyroxenite and dunite, heated for 9 months to 1200–1300° in the wall of a furnace, with exclusion of reducing gases, were recrystallized without melting. Olivine and serpentine changed into rhombic pyroxene, FeO being oxidized and H_2O lost. This proves that recrystn. can occur in solid rocks, and the following classification is proposed: Igneous-eumagmatic, cryst. directly; paramagmatic, recryst. Metamorphic-protocrystals sepd., from soln.; paracrystals, recryst.; and metacrystals, the result of hydro-metamorphism. E. T. WHERRY.

Petrographic-geologic Study of the Salt Beds at Upper Aller. KURT BECK. Leipzig. *Z. prakt. Geol.*, 19, 289–308.—Contains several analyses. E. T. W.

The Geologic Age and Economic Importance of the Iron Deposit at Schandelah, Brunswick. E. HARBORT. Berlin. *Z. prakt. Geol.*, 19, 308–12.—Analysis. E. T. W.

The Genetic Relations of the Otavi Copper Ores. P. KRUSCH. Berlin. *Z. deut. geol. Ges.*, 63 (*A*), 240–63.—These rich deposits of chalcocite are the result of "cementasion-metasomatosis," or secondary enrichment, of a low grade ore pptd. from ascending tolns. in fault fissures between aplite and dolomite. E. T. WHERRY.

Eruptive Quartz Veins in the Vicinity of the Vogtländ-West Erzgebirge Granit Mass. BRUNO BAUMGÄRTEL. Min. Inst., Kgl. Bergakad., Claustal. *Z. deut. geol. Ges.*, 63(*A*), 175–239.—Milky quartz veins containing small amts. of mica and other accessories, traversing the schists of this region, prove to be eruptive in character, and to be connected with the granitic intrusions. E. T. WHERRY.

The Ore Veins at Siglitz, Böckstein, Salzburg. RICHARD CANAVAL. Klagenfurt. *Z. prakt. Geol.*, 19, 257–78.—Small amts. of Au, distributed through sulfides in quartz veins, have been liberated and conc. by meteoric waters. E. T. WHERRY.

Classification of the Schneeberg Ore Deposit, Tyrol. M. LAZAREVIC. Min. Inst., Montanist. Hochsch., Leoben. *Z. prakt. Geol.*, 19, 316–21.—The relations of the Pb, Zn, and Cu sulfides to the wall rocks show these veins to be of metasomatic origin. E. T. WHERRY.

Geology and Ore Deposits of the Breckenridge District, Colo. F. L. RANSOME. U. S. Geol. Survey. *Prof. Paper*, 75, 187 pp., maps.—This report covers a district of 45 sq. miles about 60 miles S. W. of Denver. The rock formations differ from those at Leadville and Tenmile in that the thick body of Paleozoic sedimentary rocks is absent, formations of later (Mesozoic) age resting directly on a base of pre-Cambrian rocks. During the ice age there were 2 advances and retreats of glacial ice. The earlier glaciation is represented by terrace gravels and by what has been called hillside wash; the later one by moraines and low-level gravels or valley trains. These later glacial deposits occupy the bottoms of the present valleys to a depth of 25–90 feet and are yield-

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ing an important amt. of Au to dredges each yr. Mineralogically the Breckenridge district, although noted for the occurrence of cryst. native Au in filiform and leafy aggregates of remarkable delicacy and beauty, is not of great or varied interest. The petrography of the igneous rocks is taken up in full. For example the mineralogical composition of quartz monzonite porphyry from Brewery Hill was detd. to be: Quartz 27.14, orthoclase 22.67, andesine ($Ab_{66}An_{34}$, or nearly Ab_2An_1) 39.61, biotite 3.46, hornblende 1.11, magnetite 3.02, titanite 0.98, pyrite 0.09, H_2O, (not used in calculation) 0.74, apatite, zircon, allanite, etc., 0.81, total 99.63. Under the heading "metamorphism" are described alterations in the rocks due to igneous intrusions, ore deposition and deep weathering, especially those changes effected by ore-bearing solns. in the wall rock. R. C. WELLS.

China Clay: Its Nature and Origin. GEORGE HICKLING. *Trans. Manchester Geol. Soc.*, 30, 334–59.—China-clay is the product of the artificial extraction by washing of the finest particles from decomposed granit. Kaolinite and muscovite make up 90% or more of the material and quartz and a little tourmaline the balance. The kaolinite occurs in irregular curved hexagonal prisms or plates with its usual optic properties. It is sol. in superheated H_2SO_4. The chem. comp. of the Cornish china-clays correspond to a mixt. of kaolinite, muscovite and a little quartz (tourmaline is negligible). The kaolinite corresponds in comp. to $Al_2O_3.2SiO_2.2H_2O$ and the muscovite is hydrated. The turbidity of feldspars is not due to kaolinization but muscovite is first formed and this changes to kaolinite. Atm. weathering is the cause of the kaolinization of the granit. E. S. LARSEN.

Some Contributions to the Criteria of the Enriched Sulfide Zone. M. LAZAREVIC. Min. Inst., Montanist. Hochsch., Leoben. *Z. prakt. Geol.*, 19, 321–7.—From a study of Cu ores from various localities it is concluded that enargite is essentially primary; that covellite and chalcocite are rare in primary deposits not because of instability, but because of the tendency of the ever present Fe to unite with them to form chalcopyrite, etc., while in secondary formations this Fe is oxidized and removed from the sphere of action; and that the kaolin found in enriched sulfides has been formed, not by the action of H_2SO_4 on Al silicates, but by the same process of weathering which have developed it in the wall rocks of the veins. E. T. WHERRY.

Tungsten in Montana. CH. E. MORRIS. *Eng. Mining J.*, 92, 784.—Hübnerite was recently discovered near Ponty, Mont. The ore occurs in quartz in long brownish needle-like crystals. ROBERT KANN.

Sulfide Ores in Oxidized Zones. CH. R. KEYES. *Eng. Mining J.*, 92, 793–4.—The occurrence of sulfide ores in desert lands high above the oxidized zone is puzzling. Such sulfide ores are commonly regarded as merely the unoxidized portions of primary sulfide bodies, but this has recently been considered erroneous in some cases. In most climates where the vadose zone is shallow, it is customary to ascribe the origin of the ore materials to foreign sources. Missouri Pb and Zn regions are cited in illustration. The sulfide ores are largely of vadose origin; their deposition is contemporaneous with that of the oxide ores and they are chiefly confined to basins in the vadose zone, whereby peculiar tectonic conditions meteoric and ground waters are locally impounded. ROBERT KANN.

The Chemical and Physical Processes Involved in the Formation of Residual Clay. H. O. BUCKMAN. Cornell Univ. *Trans. Am. Ceram. Soc.*, 13, 336–84.—Muscovite is much more resistant to soln. than is biotite. In feldspars the most basic are the least resistant to soln. With igneous rocks, the texture remaining const., the more basic the rock the less the resistance to weathering; but for sedimentary rocks no such statement can be made. "Laws of rock resistance" are given, other factors in

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each case being const.: (1) The more basic the rock the more rapid its decomp., (2) increase of Na or K accelerate decomp., Na more than K, (3) Mg and Ca hasten decomp., Ca more than Mg, (4) increase of Al lessens decomp. A very complete bibliography of rock weathering and of analyses of fresh and altered rocks is appended.

C. H. KERR.

Note on some Albitite Dykes in Nevada. F. L. RANSOME. *J. Wash. Acad. Sci.*, 1, 114–8.—The dykes occur in Humboldt Co. The rock consists chiefly of feldspar very close to albite, and dark crystals of anatase. The latter is not an alteration product. Calcite, kaolinite and quartz are also found. The calcite appears to have been introduced by soln. in miarolitic cavities; the kaolinite also may have been carried in by infiltration. Quartz also appears secondary. Analysis shows: SiO_2 61.71, Al_2O_3 16.63, Fe_2O_3 and FeO 0.40, MgO none, CaO 5.94, Na_2O 8.52, K_2O 0.16, H_2O 0.51, H_2O 0.81, TiO_2 0.79, ZrO_2 0.04, CO_2 4.05, P_2O_5 0.15, sum 99.71%. The place of albitite in the American quant. classification of rocks is discussed.

A. A. KLEIN.

Rock Crystal: Its Structure and Uses. A. E. H. TUTTON. *J. Roy. Soc. Arts*, 59, 1049–54.—Cantor lecture. Historical (cf. *C. A.*, 4, 293). It is suggested that the soln. and deposition of SiO_2 may be a reversible action depending upon the OH^- conc. in the soln., which in turn varies with the CO_2 content. A single quartz crystal from Calaveras Co., Cal. is stated to weigh over a ton.

R. C. WELLS.

Composition of the Gases of Mud Volcanoes. K. V. KHARICHKOV. *Chem. Tech. Ztg.*, 29, 126.—Although the study of these gases has an important bearing upon the origin of petroleum and natural gas, as well as upon the causes of their self-ignition, they have been but little investigated. The analyses of some of the gases follow

Location.	H_2S.	Unsatd. hydrocarbons.	CO_2.	CO.	H.	CH_4.	C_2H_6.	N.	PH_3.	O.
Baladjary.....	trace	0.0	0.2	1.0	....	90.8	0.0	6.0	0.0	2.0
"Arbat" station.....	0.0	0.8	3.0	0.0	....	81.6	....	10.4	trace	1.0
Adji-Kabull.....	trace	2.2	4.4	3.6	....	50.5	....	34.4	trace	5.4
Marasy near Schemach.	...	0.28	0.28	...	....	41.3	45.6	9.68	trace	2.86
Keljany.....	0.31	0.4	4.0	...	....	76.05	....	18.89	...	0.2

Attention is called to the presence of PH_3 in the gases.

O. E. BRANSKY.

Dielectric Constants and Conductivity of Rocks. HEINRICH LÖWY. Göttingen. *Centr. Min.*, 1911, 573–9.

E. T. WHERRY.

Notes on the Cobalt Area. W. G. MILLER. *Eng. Mining J.*, 92, 645–9.—The oldest, or basement rocks, are known as the Keewatin series. They consist essentially of basic volcanic types, together with dike rocks and more or less sedimentary material, probably representing submarine chem. ppts., and consisting of chert-like material and jaspilite or interbanded SiO_2 and Fe ore. In the Keewatin there is also a certain quantity of volcanic fragmental material. The ore deposited by both magmatic and meteoric waters occurs chiefly in calcite veins in the sill and walls.

ROBERT KANN.

Southern Sonora and Chihuahua. C. W. BOTSFORD. *Eng. Mining J.*, 92, 704–6.—A description of the country northeasterly from Alamos toward Chihuahua, and enumeration of the mines and prospects. The ore occurrences are found usually in andesites, frequently in the sedimentaries, and rarely in the granits as fissure veins and some contact metamorphic deposits in limestones.

ROBERT KANN.

The Composition of the Fine Ejecta and a Few other Inorganic Factors of Taal Volcano. A. J. COX. *Philipp. J. Sci.*, 6, 93–7.—Analyses are given of the ash from

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this volcano and of volcanic tuffs from various localities to show similarity. There are 2 possible sources of injury to plants: (1) H_2SO_4 formed by the oxidizing influence of the elec. discharge on a mixt. of SO_2 and H_2O; (2) salts of Fe, often mistaken for S, which give free acid by hydrolysis when in soln. A. A. KLEIN.

Geologic Features of the Alaskan Metalliferous Lodes. A. H. BROOKS. U. S. Geol. Surv., *Bull.* 480–C.—B. discusses the geographical and geological distribution of the Alaskan metalliferous lodes. Among the ores described are those of Au, Ag, Cu, Pb, Zn, Sn, W, Fe, Sb, etc. The Cu deposits are of 5 types according to the mode of origin: (1) Deposits in zones of igneous metamorphism; (2) associated with intrusive rocks but not within the zone of igneous metamorphism; (3) disseminated in intrusives; (4) associated with ancient volcanic rocks and sediments; (5) Cu-bearing amygdaloids. Each of these types are described separately as to origin, associates and geographical distribution. A. A. KLEIN.

Salty Earth in a Bend of the Niger. A. HÉBERT. *Bull. soc. chim.*, 9, 842–3.—The earth is impregnated with crystals which can be easily separated. Analysis of the earth: Cl 4.05, SO_3 5.26, CO_2 traces, NO_3 0.007, SiO_2 71.00, P_2O_5 nil, Al_2O_3 1.05, Fe_2O_3 1.45, CaO 2.24, MgO 2.50, K_2O trace, Na_2O 7.98, N 0.042. Analysis of the crystals: H_2O 0.40, Cl 60.40, Na 39.20. This deposit is important due to the fact that tropical Africa is noted for its scarcity of NaCl. A. A. KLEIN.

The Role of Algae in the Formation of Calcareous Deposits. P. LEMOINE. Paris. *Rev. gén. sci.*, 22, 645–50.—A number of calcareous deposits are known, which were formed by algae, rather than polyps. In many cases both have acted. These processes are still going on at the sea bottom. The Florida deposits, those of Spitzbergen, Iceland, France and along the Mediterranean are examples of algae (Lithothamniee) deposits. These L. live in both hot and cold water and form deposits at depths ranging from 0–80 m. Other algae (Cholorophycee) live in warm and temperate climates and form deposits 0–80 m. In fresh water, travertin is formed by algae and owes its colors to them. Algae are also a factor in the formation of oölites. A. A. KLEIN.

The Economic Geology of Carson Camp, Hinsdale Co., Colo. E. S. LARSEN. U. S. Geol. Sur., *Bull.* 470-B, 22–31. A. A. K.

The Geology of Upper St. Joe River Basin, Idaho. J. T. PARDEE. U. S. Geol. Surv., *Bull.* 470–B, 31–54.—Discussion of the geography, geology and mineralization. Mineralization of the country rock by the introduction of grains of pyrite, chalcopyrite and siderite is found in certain formations and under certain conditions. An example of this is the occurrence of grains of siderite disseminated in the sandstones representing the lower part of the Newland formation. A. A. KLEIN.

Ore Deposits near Pinos Altos, N. Mexico. S. PAIGE. U. S. Geol. Sur., *Bull.* 470–B, 101–18.—The ore occurs in fissure veins, which are characteristic by a similar mineral content. In all of them may be found quartz, pyrite, chalcopyrite and calcite; in most of them, sphalerite and galena. In some, barite and rhodochrosite. Au and Ag are present in all the veins. Mineralization occurred as follows: A fracture was formed in the country rock and filled by solns. carrying Zn and Fe sulfides. Fracturing continued and solns. carrying SiO_2 and FeS_2 and a trace of ZnS and PbS circulated through quartz and pyrite being pptd. Mineralization ceased and then proceeded again, sphalerite and chalcopyrite being now deposited. Parts of the veins along the center were probably never completely filled. A. A. KLEIN.

Gold Placer Mining Developments in the Innoko-Iditarod Region. A. G. MADDREN. U. S. Geol. Surv., *Bull.* 480–1.—A historical, geographical and geological sketch is given. The placer-gold deposits appear to be of local origin. The origin of the Iditarod placers is closely connected with the mineralization, which has taken place

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locally along the contacts of the acid igneous with the more basic igneous rocks and sedimentary formations. In the Innoko district, the placers are derived from the siliceous dykes which are mineralized with pyrite and quartz. Some of this quartz is known to contain Au. A. A. KLEIN.

Notes on the Chemical Composition of Several Platinum Ores from the Urals. L. DUPARC AND H. C. HOLTZ. *Min. petrog. Mitt.*, 29, 498–504; cf. *C. A.*, 5, 3553.—The Au was first sepd. After the removal of the Pt, Pa and Cu, reduction of the soln. resulted in a dark ppt. of Ir, Ru, and Rh. In some cases the Cu and Pd were not first removed, but were pptd. with the Ir, etc. The analyses are computed after deducting the sand content. A comparison of the analyses shows that, while the Pt derived from a given dunite body may vary remarkably, yet this Pt has certain characteristics which distinguish it from the Pt of other dunite bodies and, moreover, the crude Pt derived from pyroxenite is characterized by its richness in Pt and Pd and its poverty in osmiridium. E. S. LARSEN.

9. METALLURGY AND METALLOGRAPHY.

WILLIAM BRADY, WILLIAM T. HALL.

Determination of Dust in Blast-furnace Gas. W. BRADY AND L. A. TOUZALIN. *J. Ind. Eng. Chem.*, 3, 662–70.—An important article which represents an enormous amt. of research work. A method and app. have been finally evolved, giving correct ultimate figures. E. J. ERICSON.

The Gases Contained in Steels. G. CHARPY AND S. BONNEROT. *Compt. rend.*, 152, 1247–50.—The authors present results of expts. on the heating of Martin steel *in vacuo* at 950°. The time of heating varied from 5 hrs. to 11 days. The gases evolved are not exclusively those previously dissolved in the steel but are in part formed by a reaction between the C of the steel and traces of water vapor in the app., *e. g.*, H and CO. Results with different steels showing that in each case the % of CO in the gases liberated lies between 26 and 32. A detn. of the critical points of a hard and soft steel in a vacuum indicates no variation in the temp. or in the amts. of heat evolved whether the expt. was carried out before or after the extraction of the gases. J. S. GOLDBAUM.

Toncan Metal. ANON. *Elec. Rev. West. Elec.*, 59, 237–8.—A galvanized ingot Fe combining the essential qualities of high corrosion-resistance, ductility, and moderate cost has been developed by the Stark Rolling Mill Co. of Canton, O. C. N. MOORE.

Metallurgy of Antimony. L. GUILLET. *Bull. soc. ing. civ. France*, 64, 745–889; through *Rass. min.*, 35, 173–5.—Brief review. CHAS. A. ROUILLER.

Preparation of Molding Sand for Foundries. A. BASEVI. *Rass. min.*, 35, 190–3.—Brief description, with photographs, of the machines manufd. by the "Maschinenbau Anstalt Humboldt." CHAS. A. ROUILLER.

Production of Metallic Coating by Friction. II. O. HILDEBRAND. *Elektrochem. Z.*, 18, 163.—Detailed directions are given for (1) plating Sn on Zn, Cu, Pb, Fe, brass, cast Fe and steel, (2) brass on Zn, (3) Ni on Cu and Cu-plated metals, (4) Ag on Cu, brass and other alloys, (5) Au on Ag, Cu, Sn and brass. The process has been described before (cf. *C. A.*, 5, 3658). W. E. RUDER.

A New Method for Soldering Aluminium. ANON. *Elektrochem. Z.*, 18, 178.—Cleaning the surface by acids or molten salts is supplemented with a deposition of Ni and Sn. W. E. RUDER.

Small Open Hearth Furnace. WALTER MACGREGOR. American Steel Foundries,

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Indiana Harbor, Ind. *Chem. Eng.*, 14, 415–7.—The author from theory and practice deduces figures from which he concludes that with 5-ton oil-burning furnaces for steel-casting work longer flues should be used; that the outside length of the furnace should not be less than 22 ft. and the hearth should approach a more square shape than the oblong shape in general use; and that for the very hot metal needed for castings, compressed air for atomizing and burning the oil gives enough better results than superheated steam to warrant its use. L. W. SPRING.

Concentration and Purification of Iron Ore, High in Sulfur, by Roasting in a Rotary Kiln. JAMES OTIS HANDY AND JOHN M. KNOTE. Pittsburg Test. Lab. *J. Ind. Eng. Chem.*, 3, 723–30.—Lab. muffle roasting expts. on Fe ore of Fe 40.66%, Mn 1.95%, CaO 7.40%, MgO 5.10%, CO_2 21.80%, Al_2O_3 1.25%, SiO_2 6.32%, S 4.01%, and P 0.015% proved that for complete desulfurization the normal roasting temp. (650–750°) for pyrite must be exceeded, complete elimination occurring only at 1100–1200°, about the sintering point of the ore, that without presence of O, up to $^1/_2$ of the S can be distilled off at 1150°, and that roasting can be done in presence of combustion products at required temp. if excess of air is present. Practical expts. using a rotary kiln show that the S is practically all expelled during 30 ft. of travel (in this case 1 hr.) through the kiln at 1100–1200°. L. W. SPRING.

Method of Gold Assay. G. M. AUSTIN. *Inst. Min. and Met.*, May 31, 1911; through *J. Soc. Chem. Ind.*, 30, 750.—The method of DeLuce, extracting Au from the ore by I soln., pptg. and collecting the Au by Hg, dissolving the Hg by HNO_3 and weighing the Au residue, was tested with various ores. Silicious, hematite, and telluride ores gave good results. Low results were obtained with pyritic ores, stibnite, mispickel, zinc blende and ores containing Mn. L. W. SPRING.

New Use for Eucalyptus Oil. R. T. BAKER. *Nature*, June 29, 1911; through *J. Soc. Chem. Ind.*, 30, 900.—The Board of Health of Australia requires all eucalyptus oil sold for therapeutic purposes to contain 50% or more of eucalyptole. The phellandrene oils excluded by this regulation are found to give better results than any other oils thus far examd. for use in conc. of ores and of "tailings" from Broken Hill ores. A concentrate containing 47% Zn, 10% Pb, and 15 oz. Ag is said to be obtained with $^1/_2$ lb. of eucalyptus oil per ton of concentrate. The demand for phellandrene oils has increased enormously. L. W. SPRING.

Huntington Mills in Nicaragua. CLARENCE C. SEMPLE. *Bull. Am. Inst. Min. Eng.*, 58, 799–810.—The ore consisted of oxidized products from what had originally been sulfides—pyrite, chalcopyrite, etc.—mixed with quartz. The feldspathic country rock has contributed a clayey admixture, making a very sticky ore, valued at $4 per ton. The bullion runs about 800 fine in Au, and 60–80 in Ag. The mills were fitted with 30 mesh brass wire screens. The pulp was passed over plain Cu plates dressed with a little Zn–Au–Ag amalgam. By lab. test 54% of the Au could be amalgamated; in practice but 33% was obtained, because of clogging of plates by $Fe(OH)_3$ and clay and because of leakage of lubricator from the mills and other conditions. Amalgamation inside the mills was unsuccessful. The Huntington mills are applicable with ores that slime badly under stamps, having a high screening efficiency. They wear rapidly. Running at higher speeds increased their service. E. WALLER.

Recent Developments of Iron Ore Mining in Lorraine. KOHLMANN. *Stahl u. Eisen*, 31, 469–79, 544–56. E. J. WITZEMANN.

New American Blast-furnace Installations. O. SIMMERSBACH. *Stahl u. Eisen*, 31, 641–7. E. J. W.

An Attempt to Explain the Role of Slag in Metallurgical Porcesses. CARL DICHMANN. Riga. *Stahl u. Eisen*, 31, 749–59, 797–804, 891–7.—The lack of knowledge

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of the properties of silicates of even the common metals and the solubility of silica, metallic oxides and other silicates in them is deplored, because of its large significance in industries. D. studied the solubility of metallic oxides and SiO_2 in Fe silicate. $FeSiO_3$ was taken as the characteristic type and was expressed as $RO.SiO_2$ in which R may be either Mn or Fe. If we have a slag which is 34% SiO_2, 55.36% FeO, 8.49% Fe_2O_3, and 0.36% CaO we may express the same results thus: 74.8% $FeSiO_3$, 14.56% FeO, 8.49% Fe_2O_3, 0.36% CaO or 100 parts $FeSiO_3$ contain 20 parts FeO, 11.4 parts Fe_2O_3, etc., in soln. when melted. A high SiO_2 slag showed on analysis 69.5% SiO_2, 15.34% FeO, 9.37% MnO, etc., or 45.46% (Fe + Mn) SiO_3, 48.75% SiO_2, etc., or 100 parts (Fe + Mn) SiO_3 in 107 parts SiO_2, etc. This method is applied to the slags occurring in the various phases of Fe metallurgical processes. Slags in heating furnaces are simple solns. of Fe oxides in silicates and the furnaces should be replenished with pure SiO_2 instead of bases (impurities merely increase the quantity of slag produced). In m. furnaces the reactions may be numerous and various depending on the amt. of O. For instance $5FeO + 2P \longrightarrow P_2O_5 + 5Fe$ and $2FeO + Si \longrightarrow SiO_2 + 2Fe$ do not indicate the strong acid character of P_2O_5 and SiO_2 under these conditions and that salts like $Fe_3P_2O_8$ and $FeSiO_3$ must be the products. The extent of the removal of P and Si and C and Mn as well will depend on the available supply of O. Moreover dissociation phenomena may play a large role. The idea that the affinity of substances for O increases steadily with the temp. is only partly true; even FeO gives off O at 1200°. Other oxides behave likewise. C is a notable exception; at 3500° it retains its affinity for O and burns to CO; only at lower temps. does it burn to CO_2. A very graphic explanation of the reducing action of C is as follows: By sufficient heat the affinity between the metal and O is diminished, while on the other hand the tendency of O to change to CO is increased, and since CO has the highest dissociation temp. of any known O compd. C may serve as a reducing agent for all oxides. Other types of furnaces are discussed and much analytical data given of the Fe and the slag at various stages in the processes. E. J. WITZEMANN.

Attempt to Calculate the Amount of Direct Reduction in the Blast Furnace. F. WÜST. *Stahl u. Eisen*, 31, 953–5.—"Direct" reduction is the reduction of Fe oxides by C; "indirect" reduction is that produced by CO. W. gives a new method for calculating the amt. of direct reduction. The amts. of C used to convert O of the blast to CO, to act on the moisture of the blast, to supply the C of the pig Fe, that leaving the furnace as CH_4 and the amt. required for the reduction of the oxides of Mn, Si and P of the pig Fe added together (all calc. for 1 ton of pig Fe) and subtracted from the total C in the coke leaves the amt. used in direct reduction of the Fe oxides. The results obtained by applying the method to Gillhausen's figures (*C. A.*, 5, 1391) are given. E. J. WITZEMANN.

The Use of Briquets from Steel and Cast-iron Turnings in Cupola Operation. E. A. SCHOTT. Kassel. *Stahl u. Eisen*, 31, 1044–5.—It is necessary to use briquets from turnings mixed with other materials in order to get good results regularly. When cylinder castings were made from 70% cast Fe, 20% cast Fe turnings briquets and 10% steel turnings briquets gave a tenacity of 16.0–24.6 kg. per sq. mm. Cylinders from 70% high-Si cast Fe and 30% briquets of steel turnings had a tenacity from 16.5–29.6 kg. per sq. mm. E. J. WITZEMANN.

The Utilization of Briquets from Cast-iron Turnings. E. SCHOEMANN. Magdeburg. *Stahl u. Eisen*, 31, 1045–8.—The addition of such briquets reduces the C content which is advantageous in certain castings like cylinders for engins. However it increases piping and raises the S content which limits its value. E. J. W.

Thiogen Process for Reduction of Sulfur Dioxide in Smelter Fume. STEWART W. YOUNG. *Mining Sci. Press*, 103, 386–7.—Theoretically the chem. of this process

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consists of the reaction: $SO_2 + CH_2 = S + CO + H_2O$. Practically, however, this direct reaction is not satisfactory, since (1) O in the gases causes loss of hydrocarbons, (2) the reaction is slow and incomplete, and (3) all of the available energy of the hydrocarbon is not utilized, for the C is oxidized to CO instead of CO_2. The SO_2, however, may be absorbed in a basic sulfide: $2CaS + 3SO_2 = 2CaSO_3 + 3S$; and the $CaSO_3$ may then be reduced: $2CaSO_3 + 2CH_2 = 2CaS + 2CO_2 + 2H_2O$. Here the reduction of the sulfite and the combustion of the hydrocarbon are both complete. Another reaction may also be used: $3FeS_2 + 2SO_2 = Fe_3O_4 + 8S$; but this reaction is slow and requires external heat. A cheaper reducing agent than hydrocarbon oils is needed. EDW. WOLESENSKY.

The Influence of Carbon and other Elements on the Corrosion of Steel. J. O. ARNOLD, *et al. Chem. News*, 104, 142–3; *Chem. Trade J.*, 49, 263–5.—Pure Fe–C alloys were prepared, by the coke crucible process, from Swedish bar-Fe and charcoal, with C content varying from 0.1–0.96. No trace of MnS could be detected by microscopic exam. of the alloys. Corrosion tests were made on the metal as rolled, normalized, annealed, hardened and tempered, and hardened,—thus resolving the pearlite into the various states in which it is found in ordinary steels. Corrosion by sea-water showed that the influence of the C upon corrodibility is dependent upon the condition of the carbide as well as the amt. The finer the state of subdivision in the pearlite, the greater the corrosion. In the rolled, normalized, and annealed condition the corrodibility increases irregularly with the rise in C content until the saturation point (0.89% C) when cementite appears. In the hardened and tempered specimens, however, the corrodibility rizes continuously from 0.1–0.96% C. The solubility in acid solns. was also tested and here again the influence of heat treatment was marked but the curves representing the solubility in acid do not correspond to those illustrating the corrosion by sea water. In the normalized, rolled and annealed specimens the solubility rizes very rapidly from 0.1–0.22% C, after which it falls abruptly reaching a minimum at 0.3–0.4% C. A comparison with the curves obtained by Heyn and Bauer (*C. A.*, 3, 2551) was made and it appears probable that the disagreement was caused by the presence of Mn in the samples studied by them. The tempered steels show a rapid rise in solubility with rise of C from 0.1 to 0.30% but there is no further rise until 0.55% C is reached when the solubility steadily increases up to 0.96% C. In the case of hardened steels, the C exerts an effect similar to that found in steels tempered at 400° but the variations are much less pronounced and the total rise in solubility from 0.10 to 0.96% C is very small. It is impossible to specify any particular comp. or treatment as offering the best resistance to attack under all conditions.
WILLIAM T. HALL.

The Mechanical Properties of Hard-drawn Copper. D. R. PYE. *Engineering*, 92, 403–5.—After testing specimens of hard-drawn Cu wire obtained from several manufacturers, P. suggests that a satisfactory definition of hard-drawn Cu should run: "Hard-drawn Cu, when in the form of circular wires, shall have a tensil strength not less than $T = 30 - 20\,D$ and an extension % on a marked 10 in. length, including the point of fracture, of not less than that given by the formula $e = 5\,D$." In these formulas, T = tensil strength in tons per sq. in. of original section, e = extension % and D = diam. of the cylinder circular rod in inches. The paper ends with an appendix on the effect of hard-drawing on the elec. properties of Cu. W. T. H.

Non-ferrous Metals in Railway Work. GEORGE HUGHES. *Engineering*, 92, 399–403, 433–6.—H. outlines the practical side of the subject, stating difficulties in manuf. and some means of overcoming them; wear and tear; and the life of the various non-ferrous component parts of the rolling stock. W. T. H.

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Metallography. W. GUERTLER. *Fortschritte Chem.*, 4, 279–92.—Review for the period Jan., 1910–April, 1911. J. J.

The Influence of Heat Treatment on the Strength and Microstructure of Hypereutectoid Steels. A. JUNG. Kgl. Techn. Hochschule, Charlottenburg. *Inst. Z. Metallog.*, 1, 209–55.—J.'s conclusions are: (1) For hyper-eutectoid C steels the temps. to be employed in hardening are restricted to a definit range, and this range lies the lower and is the more restricted the lower the C content is. (2) The ultimate strength increases, for a given C content, as the temp. of quenching falls, until a limit is reached where further lowering of quenching temp. does not alter the results any more. (3) For equal quenching temps. the ultimate strength increases with increasing C content. (4) When hardening in different media, the same quenching temps. should be adhered to. (5) The greatest strength is attained by quenching in water followed by tempering at 350°, but the time of tempering must not exceed a certain value. (6) By quenching in water and tempering, a comparatively brittle material with high tenacity is obtained, while by quenching in a medium at the same temp. as that employed for tempering, a material of low tenacity but greater toughness is obtained. (7) Different forms of heat treatment of hardened and tempered steels cannot be made to produce identical results; identity of results can only be obtained for any one property of the steel. (8) The mechanical properties of the material depend not only on the state of the C, but also upon the structure of the metal. (9) Martensitic structure gives the steel the greatest hardness, troosto-sorbitic structure the highest tenacity, and pearlitic structure the greatest elongation. (10) Within the limits of these expts. it is not possible to detect any regular and consistent influence of C-content on the strength of samples whether hardened in water and tempered, or quenched in oil or Pb–Sn baths." C. H. MATHEWSON.

Testing the Hardness of Metals. A. F. SHORE. *Iron Age*, 86, 490–1.—Tensil, cutting, abrasive, elastic, static and shock hardness are defined but it is claimed that the really important kind of hardness may be defined as rigidity and resistance to penetration or deformatiom. A list of hardness standards now used by automobil engineers is given. I.. A. TOUZALIN.

Bearing Metals. I. White Metals. E. HEYN AND O. BAUER. *Stahl. u. Eisen*, 31, 509–12.—A summary of *C. A.*, 5, 3036. E. J. WITZEMANN.

Zinc Coating of Pipes (KRÖHNKE). 14. Corrosion of Metal Pipes (CLARK, GAGE). 14. Preservation of Iron (MARGEVAL). 26. Galvanizing Wire (LANG). 4. Bright Tin Coatings. 4. Determination of Moisture (CRISFIELD). 1.

U. S., 1,005,142, Oct. 10. R. C. BECKER, Pittsburgh, Pa. **Composit steel bar for jail bars, etc.,** comprizing a body of relatively soft steel having extending longitudinally therein a portion composed of hard Mn steel containing 1.3–1.4% C and 13–15% Mn.

U. S., 1,005,230, Oct. 10. S. S. KNIGHT, Webster Groves, Mo. **In making a cast metal car wheel,** pressing the body portion of the wheel so as to force any surplus metal outwardly into the tread portion, and simultaneously removing the surplus metal and rolling the tread of the wheel while it is still in a heated state after it has been removed from the mold in which it is cast.

U. S., 1,005,231, Oct. 10. *Idem.* **Machine for pressing and rolling cast-metal car wheels.**

U. S., 1,005,361, Oct. 10. W. M. THEOBALD, Cleveland, Ohio. **Heating and rolling bars in the manufacture of sheet metal,** the bars being first pickled to remove

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scale and then heated in bulk or piles in a movable box to a rolling temp. while protected from the atm., the bars being withdrawn from the closed box only as required for rolling so that they are kept hot.

U. S., 1,005,396, Oct. 10. H. C. WOLLE, Westmont Borough, Pa. **Rotary sintering furnace** with a refractory lining, a narrow metallic cooler arranged longitudinally therein, sep. circulating passages in the cooler, supply and discharge conduits arranged exteriorly of the furnace on its axial line and provided with revoluble joints so that connection is maintained between the circulating passages and the supply and discharge conduits.

U. S., 1,006,186, Oct. 17. J. J. DUNN, Ellwood City, Pa. **In making seamless, cold-drawn tubes,** annealing the hollow blanks by heating above the upper critical point and then cooling and subjecting the annealed blanks to the usual cold drawing operation, the drawn tubes being annealed at a temp. not exceeding the upper critical point.

U. S., 1,006,267, Oct. 17. D. M. OWINGS AND W. M. OSBORN, Canton, Okla. **Dry-process machine for separating gold.**

U. S., 1,006,293, Oct. 17. R. T. SCHRAUBSTADTER, St. Louis, Mo. **Concentrator.**

U. S., 1,006,323, Oct. 17. L. E. WEMPLE, St. Louis, Mo. **Refining lead or lead alloy** by bringing the molten metal into intimate contact with an alkali hydroxide (preferably NaOH), withdrawing the molten metal from the vessel and sepg. the alkali hydroxide by the addition of $NaHSO_4$.

U. S., 1,006,355, Oct. 17. F. R. CARPENTER and A. H. CARPENTER, Denver, Colo. **Freeing sulfide copper-nickel-iron ores and mats derived therefrom from their copper** by dead roasting, adding sulfides and NaCl, subjecting to a chloridizing roast to chloridize the Cu and leave the Fe and Ni as oxides, leaching the Cu from the mass and smelting the "blue billy" or purple ore remaining for the production of ferro-Ni or Ni-steel.

U. S., 1,006,433, Oct. 17. R. T. CARTER, Carlton, Victoria, Australia. **Concentrator and amalgamator.**

U. S., 1,006,602, Oct. 24. F. N. SPELLER, Pittsburgh, Pa. **Eliminating surface defects from metal blanks** for making pierced billets by reducing the cross-sectional area by rolling and corrugating the surface longitudinally and removing the corrugations by subsequent rolling.

U. S., 1,006,849, Oct. 24. G. F. HOFMANN, Munich, Ger. **Pyrophoric alloy** consisting of Mn, Sb and Ce.

U. S., 1,006,865, Oct. 24. C. W. MERRILL, Berkeley, Cal. **Precipitating and recovering metals from solution** by adding a precipitant, *e. g.*, Zn, and while the soln. and precipitant are being conveyed to a filter subjecting the precipitant to mechanical treatment to remove any coating from the surface of its particles, the solids being then sepd. by the filter.

U. S., 1,006,866, Oct. 24. *Idem.* **Recovering metals from solution** as in preceding pat., the precipitant after its mechanical treatment being added in the duct through which the soln. is being conveyed to the filter.

U. S., 1,006,953, Oct. 24. J. O. KINNEY, Grand Junct., Colo. **Riffle for amalgamation of gold.**

U. S., 1,007,055, Oct. 31. W. BEARDMORE, Glasgow, Scotland. **Steel for armor plates** containing 0.15–0.25% C, 1–2% Mo, 5–7% Ni, not more than 3% W and not more than 0.7% Mn.

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U. S., 1,007,069, Oct. 31. T. W. COSLETT. **Treating iron or steel to prevent rusting;** see *C. A.*, 5, 2806.

U. S., 1,007,116, Oct. 31. O. H. KING, Chicago, Ill. **Ore concentrator.**

U. S., 1,007,124, Oct. 31. R. W. E. MACIVOR and W. HOMMEL, London, Eng. Assignors to Metals Extraction Cor., Ltd., same place. **Densifying light zinc oxide** by mixing with $ZnCl_2$ soln. and coal to form a dense solid mass, heating to drive off the $ZnCl_2$ without decomposing the coal to obtain a homogeneous mixt. of ZnO and C suitable for smelting by heat or electricity, and collecting the $ZnCl_2$ for re-use.

U. S., 1,007,144, Oct. 31. O. SCHAUMANN, Steglitz, near Berlin, Ger. **Armor plate,** comprizing a celluloid plate, an Al plate thereon, a steel plate on the Al plate, a thin, very hard protective facing plate, and asbestos between the facing plate and the steel plate.

U. S., 1,007,356, Oct. 31. A. J. HOPPER and H. F. PRINDLE, Oakland, Cal. **Condenser for fumes from smelters, etc.**

U. S., 1,007,548, Oct. 31. P. H. G. DURVILLE. **Aluminium bronze;** see *C. A.*, 5, 3043.

U. S., 1,007,606, Oct. 31. E. H. ROTHERT, Leavenworth, Wash. **Ore-reducing furnace.**

Brit., 29,376, Dec. 17, 1910. L. WEISS, 13 Hofenstrasse, Barmen-Rittershausen, Ger. Mfg. **sound metal castings** by the addition of Zr or compds. of Zr with other deoxidizing or inactive substances to the molten metal.

Brit., 29,469, Dec. 19, 1910. J. F. DUKE, Hazel Bank, Kersal, Manchester. An **alloy** composed of Fe 12 vols., Cu 6 vols., Ni 4 vols., Al 1 vol.

Brit., 41, Jan. 2, 1911. J. NAULTY, 2616 Martha St., Phila, Pa. Compounding a **chromium alloy** of copper combined with Ni by melting the Cr with Al as a flux, then adding the Cu, Ni, and a suitable bulking metal, to the molten mass, successively and in the order named. A 5% Cr alloy of Cu, fluxed with Al, is combined with Ni and Zn in the proportion of 100–120 lbs. of the Cu alloy to 45 lbs. of Ni and Zn.

Ger., 229,248, Sept. 17, 1909. W. NELLING, Vörding Bez, Arnsberg. **Hardening steel** on one surface by sprinkling the surface to be hardened.

Ger., 229,462, Nov. 10, 1908. L. KOCH, Lirgen bei Siegeshütte. **Charging apparatus for blast-furnaces** with several traveling hoppers charged at one place and discharging into one distributing hopper.

10. ORGANIC CHEMISTRY.

J. BISHOP TINGLE.

Spectrochemical Investigations. II. Refraction and Dispersion of Substances with One Pair of Conjugated Double Bonds. III. Refraction and Dispersion of Hydrocarbons, Aldehydes, Ketones, Acids and Esters with Several Adjoining Conjugated Double Bonds. K. AUWERS AND F. EISENLOHR. Chem. Inst., Univ. Greifswald. *J. prakt. Chem.*, 84, 1–36, 37–121; cf. *C. A.*, 5, 670.—All the material in the first paper has been recalc. on the basis of Eisenlohr's new at. refraction detns. (*C. A.*, 5, 1218). In this way it has been found that many of the seeming anomalies and irregularities earlier observed were in reality due to faulty data. Numerous new detns. of refractive powers made in the authors' and other laboratories since the appearance of the first paper have also been made use of. In compds. containing several conjugated double bonds, the optical relations are much more complicated and affected by many more factors than in the case of those containing only 1 such system. From the data now

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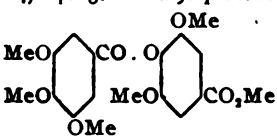
available for such compds. the following additional general conclusions may be drawn: Compds. with "crossed" (*gekreuzte*) conjugate bonds (like—C : C.C : C—) show much smaller exaltation of sp. refractivity and dispersive power than those containing "accumulated" (*gehäufte*) conjugated bonds (as —C : C.C : C.C : C—). In the latter class of compds. each additional conjugate system increases the exaltation about 3-fold. CHAS. A. ROUILLER.

N-Amino Heterocyclic Compounds. III. Properties of α-Acylhydrazines, 1-*N*-Amino-2,5-diphenyl-3,4-triazole and 1-*N*-Amino-2,5-dibenzyl-3,4-triazole. HARTWIG FRANZEN AND F. KRAFT. Chem. Inst., Univ. Heidelberg. *J. prakt. Chem.*, 84, 122–39; cf. *C. A.*, 2, 2250.—α-Acylhydrazines are attacked by yellow HgO in b. alc., the HgO turning black and the alc. soln. dark and colored oils being formed. Likewise, alkyl iodides react with these substances when heated several hrs. in sealed tubes at 100°; in this way was obtained *α-acetylphenylhydrazine iodoethylate*, yellowish crystals, m. 201°. Again, they do not form hydrazones with pyruvic acid. In general, therefore, they react like secondary asym. hydrazines, and the differences exhibited between *N*-amino heterocyclic compds. and the latter cannot be ascribed to the acid properties of the cyclic derivs. HgO in b. C_6H_6, pyruvic acid in EtOH–H_2O, BzAc at 170–80°, or b. Me_2CO do not attack 1-*N*-amino-2,5-diphenyl-3,4-triazole. *N*-Benzylideneamino-2,5-diphenyl-3,4-triazole easily forms salts of mineral acids; *hydrochloride*, cryst. ppt., m. 175° (it could not be purified by recrystn. as it loses HCl); *sulfate*, $(C_{21}H_{16}N_4)_2.H_2SO_4$, m. 178°; *nitrate*, m. 166°; *picrate*, yellow needles, m. 169°; *chloroplatinate*, $(C_{21}H_{16}N_4)_2.H_2PtCl_6$, orange ppt., m. 231°. 1-*N*-Amino-2,5-dibenzyl-3,4-triazole is likewise not attacked by HgO, pyruvic acid, BzAc or Me_2CO. *α,β-Dibenzylphenylhydrazine hydrochloride*, obtained by slowly pouring 4% Na-Hg into $PhCH_2$-NPhN : CHPh in alc. on the H_2O bath, heating 5–6 hrs. and pouring the soln. into 5% HCl, extracting the ppt. with Et_2O and crystallizing the residue from alc., m. 186°; 1 g. dissolves in about 8 cc. b. alc. NH_3 sets free the *base*, m. 42°, easily decomp. in the air; with HgO it gives $PhCH_2NPhN$: CHPh; HNO_3 and picric acid decomp. it in a like manner. With BzCl the hydrochloride forms *benzoyl-α,β-dibenzylphenylhydrazine*, m. 107°; with AcCl, the *acetyl derivative*, cryst. powder, m. 78°; KCNO does not attack it, the unchanged base sepg. out. Long b. with 20% HCl decomp. it into $PhCH_2Cl$ and $PhNHNH_2.HCl$. *Tribenzylhydrazine hydrochloride*, obtained by reduction of the benzylidene deriv. with Na-Hg or by the action of $PhCH_2Cl$ on $N_2H_4.H_2O$, needles, m. 181°, decomp. by long b. with HCl into $PhCH_2Cl$ and $N_2H_4.HCl$. Attempts to reduce *N*-benzylideneamino-2,5-diphenyl-3,4-triazole with Na-Hg were unsuccessful, diphenyltriazole being formed. CHAS. A. ROUILLER.

Synthesis of Methyl Pentamethyldigallate. F. MAUTHNER. Chem. Inst., Univ. Budapest. *J. prakt. Chem.*, 84, 140–3.—*Methyl pentamethyldigallate*,



is obtained by shaking 6 hrs. Me syringate in aq. NaOH with trimethylgallyl chloride in Et_2O; colorless needles, m. 169–70°; alc. KOH hydrolyzes it into trimethylgallic and syringic acids. CHAS. A. ROUILLER.

Steric Hindrance. P. PETRENKO-KRITSCHENKO. Univ. Odessa. *J. prakt. Chem.*, 84, 143–4.—The author expresses his satisfaction that Stewart now acknowledges ("Stereochemie," p. 395) that "in the case of cyclic ketones and amines we can explain

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the phenomena observed by a simple assumption of steric hindrance," while in 1908 he ascribed them to nascent CO groups. CHAS. A. ROUILLER.

Stereoisomeric Dihalogen Succinic Acids. BROR HOLMBERG. Lund, Univ.-Lab. *J. prakt. Chem.*, 84, 145–68.—The decomp. velocity of the 2 α,β-dibromo- and dichlorosuccinic acids and their Ba salts at 25.0° in approx. 0.033 *N* soln. was detd. by simply titrating the solns. at measured intervals. In neutral and acid solns. the reaction is of the first order and independent of the amt. of halogen acid originally present or formed as the result of the decomp., while in alk. soln. it is of the 2nd order. The values of the consts., in the order dibromo-, isodibromo-, dichloro-, isodichloro-, are as follows: Ba salt + 0.5 mol. $Ba(OH)_2$; 2.1, 370, 6.3, 57. Ba salt; 0.4, 125, 0.4, 1. Acid Ba salt: 3.8, 63, 0.4, 4. Free acid: 4.9, 57, 2, 5. Acid + 1 mol. HCl: 5.3, 58, 3, 7. (All these values except those for Ba salt + 0.5 mol. $Ba(OH)_2$ must be multiplied by 10^{-4}.) The dibromo acid is reduced smoothly and practically quant. to fumaric acid by K_2S, KSH, $KOCS_2K$, K_2CS_3, NaSEt or NaSPh; the isodibromo acid reacts very slowly, forming chiefly bromofumaric and a little fumaric acids. In no case was maleic acid detected. The secondary affinity consts., detd. from the elec. cond. of the acid Na salts, are, in the order given above, as follows: 13.6, 4.3, 8.1, 9.9 (all multiplied by 10^{-4}). Primary consts.: 0.037, 0.037, 0.030, 0.035. Expts. with diazoacetic ester checked pretty well with the above affinity constants. The corresponding values for racemic and mesotartaric acids are 40×10^{-4}, 0.14×10^{-4} and 0.00102, 0.00063, resp. Thus, while the m. p. and solubility would indicate that the iso acids are the analogs of mesotartaric acid, no regularity can be traced in the affinity consts. Attempts to prepare optically active forms of the dibromo acid failed, although cryst. *acid cinchonine* and *strychnine* salts were obtained.
C. A. R.

Reactivity of the Pyrrole Ring not Substituted in the β-Position. W. KONIG. Org.-chem. Lab., Techn. Hochschule, Dresden. *J. prakt. Chem.*, 84, 194–219.—Pyrrole and indole derivs. not substituted in the β-position show many analogies with phenols (cf. Ciamician, *Ber.*, 37, 4201). This is probably due to the fact that these compds. can give tautomeric "methylene forms" (I) with a tertiary N, just as the phenols may exist in the form, $O : C_6H_4 : H_2$. The analogies with primary amines are just as striking and, in some cases, even more so. Just as phloroglucinol, reacting in the methylene form (cf. Nef, *Ann.*, 280, 318), gives phloroglucinaldehydeoxime (Scholl and Bertsch, *Ber.*, 34, 1442) with Hg fulminates and conc. HCl, so methylketole gives the aldoxime which at once breaks down into NH_2OH and the aldehyde and the latter, in turn, forms a $HgCl_2$ double salt of a red dye. Thus, 13.1 g. methylketole, 10 g. $Hg(CNO)_2$ (moist with Et_2O), 200 cc. MeOH and 75 cc. conc. HCl, heated 4 hrs. on the H_2O bath, gave 15.4 g. of the *mercuric chloride double salt*, $C_{10}H_{17}N_2Cl.HgCl_2.MeOH$, greenish shimmering, apparently rhombic tables, m. 197°, rather difficultly sol. in hot H_2O with orange-yellow color, and dyeing tannated cotton with the same shade, loses MeOH at 120°, forming violet shimmering, red needles. *Mercuric bromide double salt*, brownish red crystals with green reflection, m. 193°. Indole itself forms a similar dye, which, however, could not be isolated in cryst. form, as acids resinify it. α,p-Dimethylindole gives a cryst. compd. Other fulminates (Na, Ag) give very small yields; preformed HON : CHCl (Nef, *Ann.*, 280, 308) gives no better results. When α-methyl-β-indolealdehyde is treated in hot MeOH instead of H_2O (Ellinger and Flamand, *C. A.*, 4, 1054) with conc. acids, the yields of salts of the dye are high. *Hydrochloride*, $C_{12}H_{17}N_2Cl.MeOH$, long, bright yellow needles, easily sol. in hot alc. with orange-yellow color, m. 248°; treated in hot MeOH with $HgCl_2$, it gives the double salt above. *Hydrobromide*, brownish needles, m. 218°; the absorption curves of this compd. and the $HgBr_2$ double salt are identical. *Hydroiodide*, deep brownish

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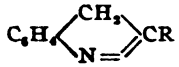
red prisms, m. 228–30°. *Perchlorate*, greenish shimmering, compact crystals or long, orange needles, m. 248° (decomp.). *Acid sulfate*, long, red needles, m. 215°. The base is obtained either from the $HgCl_2$ double salt with $(NH_4)_2S$ or from the bromide and NH_3. $PhNHNH_2$ and the hydrobromide give α-methyl-β-indolealdehydephenylhydrazone. The above facts and careful analyses of the products obtained indicate that the base is *methylindylmethylindolidenemethane* (II), and not a triindylcarbinol



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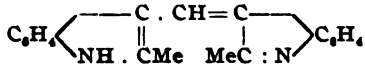

(II)

deriv., as maintained by Ellinger and Flamand. Indole and its homologs react with $HC(OEt)_3$ and conc. acids with remarkable smoothness, giving dyes of the above type. In this way were obtained: *Indoleindolidenemethane perchlorate*, greenish shimmering, ruby-red needles, m. 276°, difficultly sol. in hot MeOH with pure red color; *sulfate*, identical with the product obtained by Ellinger from β-indole aldehyde. *Bz-3-Py-2-Dimethylindole-Bz-3-Py-2-dimethylindolidenemethane perchlorate*, long, bright yellow needles with 1 MeOH, m. 245°, loses MeOH at 120°, turning crimson. *N*-Alkylindoles and skatole similarly form dyes with $HC(OEt)_3$. CHAS. A. ROUILLER.

Cyclic Ammonium Bases. HERMAN DECKER AND ADOLF KAUFMANN. *J. prakt. Chem.*, 84, 219–46.—Theoretical discussion. [Reference is made to an experimental part, but no indication is given as to where it has been or will be published, and it is difficult to det. what part of the paper is new.—ABSTR.] The cyclaminols of the isoquinoline and pyridine series, in contradistinction to those of the quinoline and acridine series, are transformed by H_2O into the isomeric ammonium hydroxides, as has already been found in isolated instances (*Ber.*, 33, 2274; Hantzsch and Kalb, *Ibid.*, 32, 3130); this dymamic equil. between the 2 forms explains the apparent disagreement between elec. cond. detns. on alk. solns. of methylpyridinium iodide, indicating the presence of a stable pyridinium hydroxide, and its easy oxidation. An NH_2 group in the benzene ring of quinoline and isoquinoline methiodides has the same effect as a OH group (Claus, *J. prakt. Chem.*, 43, 523; 54, 11; 56, 438; Decker and Dunant, *C. A.*, 2, 1450); it prevents the rearrangement into carbinol. Thus, an aminoquinoline methiodide is merely salted out of dil. soln. by alk. and more energetic action gives a yellow cryst. salt, analogous, in its complex comp. (1 mol. methiodide–1 mol. Me hydroxide–$2H_2O$), to those obtained by Claus from the OH compds. If, however, the NH_2 group is acetylated, the compd. then easily forms an acetylaminomethylquinolone. On the other hand, in 2,8-dinitroquinoline methiodide, the basic properties of the ammonium N are so weakened that the most dil. solns. of NH_3 and $NaHCO_3$ ppt. out the carbinol quant. The compd. is, however, very stable towards oxidizing agents. It is sensitive to alks., probably owing to the opening of the pyridine ring. Both of these properties are doubtless due to the loading down of the mol. with the negative NO_2 groups. Decker, however, still stands by his views that the bases obtained by treating cyclic NH_4 salts with alk. have the same cyclic carbinol and not the open aminoaldehyde structure (cf. the independent papers of Kaufmann, *C. A.*, 5, 1908, 1909, published since the above part of the present article was written), and gives his reasons therefore. He also stands by his old formula for the cyanines (*Ber.*, 24, 692), and in the light of investigations made since that time explains their formation as due to the coupling of the carbinol base with the quinaldine or lepidine methiodide and oxidation of the methiodide of the resulting leuco compd. (I) to that of

(I)

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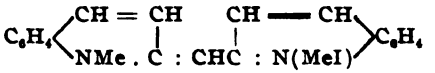
the dye (II). The reactivity of substituents in the 2- and 4-positions to the N in the

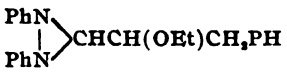


(II)

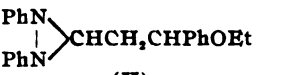
pyridine ring is due to the directive influence of this N. The formation of apocyanines is similarly explained. Evidence that carbinol bases possess aldehyde functions is abundant. Moreover, such compds. are in reality substituted aldehydeammonias.

C. A. ROUILLER.

Hydrazo Compounds. V. Reaction of Hydrazobenzene with Mixed Aldehydes. B. RASSOW AND FRITZ BURMEISTER. Tech. Abt. chem. Univ.-Lab., Leipzig. *J. prakt. Chem.*, **84**, 249–59.—On warming with $PhCH_2CHO$, $(PhNH)_2$ is merely oxidized to Ph_2N_2, but when shaken 9 hrs. in alc., it forms *phenylethylidenebishydrazobenzene*, $PhCH_2CH(NPhNHPh)_2$, felted needles, m. 93–5°. With PhCH : CHCHO in b. alc., $(PhNH)_2$ gives *1,2-diphenyl-3-(ethoxy-α-phenylethyl)hydrazimethylene*, (I) or (II)



(I)



(II)

prismatic needles, m. 135°. In MeOH, the corresponding *methoxy compound*, rhombic leaflets, m. 163°, was formed. Attempts to det. the position of the alkoxy group by heating with H_2SO_4 led to the formation of benzidine. In other solvents than alcs. (Et_2O, benzine b. 110–30°), $(PhNH)_2$ and PhCH : CHCHO give a viscous, yellow-red oil. *p*-HOC_6H_4CHO could not be made to condense with $(PhNH)_2$. C. A. R.

Hydrazo Compounds. VI. Methylhydrazobenzene and Monomethylbenzidine. BERTHOLD RASSOW AND KURT BERGER. Tech. Abt. chem. Univ.-Lab., Leipzig. *J. prakt. Chem.*, **84**, 260–77.—*Methylhydrazobenzene*, PhNMeNHPh, obtained by b. $(PhNH)_2$ with Me_2SO_4 in C_6H_6, in the presence of MgO, for 2 ds., needles or rod-like prisms, m. 75°, very stable, not turning red in the air like $(PhNH)_2$. With conc. HCl it is transformed partly (about 60%) into *methylbenzidine*, m. 83°; *hydrochloride*, $C_{13}H_{14}N_2.2HCl$, microscopic leaflets, decomp. 250–300°; *chloroplatinate*, yellowish brown ppt.; *picrate*, yellow, microscopic needles, decomp. 167–9°; *diacetyl derivative*, probably $AcNMeC_6H_4C_6H_4NHAc$, triangular prisms, m. 238–9°, insol. in dil. HCl; *dibenzoyl derivative*, microscopic needles, m. 231–3°. The benzidine condenses with 1 mol. *o*-HOC_6H_4CHO, giving the compound $MeNHC_6H_4C_6H_4N : CHC_6H_4OH$, brown crystals, m. 194°, sol. without change in cold dil. H_2SO_4 but on b. it is decomp. into the original components. With excess of MeI, the benzidine gives $(C_6H_4NMe_2)_2$. A product also formed in the transformation of PhNMeNHPh into the benzidine is a *methyldiphenyline*, leaflets, m. 124°, b_{25} about 255°. It could not be detd. whether the Me is in the *o*- or *p*-NH_2 group. *Diacetyl derivative*, thin, rhombic leaflets, m. 327°. The base combines with 3 mols. *o*-HOC_6H_4CHO, forming the *compound* $HOC_6H_4CH(NMeC_6H_4C_6H_4N : CHC_6H_4OH)_2$, reddish yellow crystals, m. 255°, insol. in dil. acids or alks. With HNO_2 and $PhNMe_2$, the benzidine gives *nitrosomethylbenzidineazodimethylaniline*, microscopic leaflets with golden shimmer from Me_2CO, decomp. 243°; alc. HCl easily removes the NO group, giving *methylbenzidineazodimethylaniline*, needles, m. 234°; *dihydrochloride*. CHAS. A. ROUILLER.

Formation of 1-Nitroso-5-methyl-3-pyrazolidone from Crotonic Hydrazide. ERNST MUCKERMANN. Chem. Inst., Univ. Heidelberg. *J. prakt. Chem.*, **84**, 278–92; cf. *C. A.*, **5**, 3572.—*Crotonic hydrazide*, neutral sirup which could not be made to crystallize; *hydrochloride*, radiating needles, m. 173° (effervescence), unstable, quickly deliquescing in the air to a tarry mass. *Crotonic benzalhydrazide*, obtained from BzH and the hydra-

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zide, m. 72°, could not be cryst. from any solvent. *Crotonic p-hydroxybenzalhydrazide*, light yellow crystals from EtOH-Et_2O, m. 190°. *Crotonic p-methoxybenzalhydrazide*, yellowish white needles, m. 99°. *Crotonylsemicarbazide*, from the hydrazide and KCNO, thick prisms from H_2O, long needles from alc. or Et_2O, m. 171°. With HNO_2, the hydrazide gave, not an azide, but *1-nitroso-5-methyl-3-pyrazolidone*, $MeCH.N(NO).NH$, CH_2——CO leaflets, m. 131°, easily sol. in NaOH or NH_4OH and repptd. by acids from conc. solns., gives a cherry-red color with aq. $FeCl_3$ and a distinct Liebermann test. *Ammonium salt*, radiating needles with 0.5 H_2O, m. 144° (foaming); *picrate*, golden yellow monoclinic columns with 1 EtOH, m. 162–4°. *Silver salt*, silky needles in spherical clusters, m. 148–9° (decomp.), turns brown very quickly in the light. *Copper salt*, $(C_4H_6O_2N_2)_2Cu.2H_2O$, thick, dark blue prisms, easily loses part of its H_2O, turning grayish black; apparently monoclinic, holohedral crystals showing the forms *a*(100), *m*(110), *n*(011), $a : b : c = 1.23 : 1 : 0.85$, distinct cleavage along (010), high light and double refractivity, strong pleochroism (bluish violet and light yellowish green to colorless), optically positive. The Ag salt and EtI give *1-nitroso-2-ethyl-5-methyl-3-pyrazolidone*, monoclinic tablets, m. 83°. *3-Methyl-4-bromo-5-pyrazolone*, from 3-methyl-5-pyrazolone or 1-nitroso-5-methyl-3-pyrazolone and Br in cold glacial AcOH, thick hexagonal tablets, m. 182°. If a larger amt. of Br is used, *3-methyl-4,4-dibromo-5-pyrazolone*, white needles, m. 132°, is formed (cf. Rothenburg, *J. prakt. Chem.*, 52, 37).

CHAS. A. ROUILLER.

Isomeric Hydrazones of Dithiocarbonic Esters. M. BUSCH AND HERMANN KRAPF. Chem. Lab., Univ. Erlangen. *J. prakt. Chem.*, 84, 293–304; cf. *Ber.*, 34, 1119.—*Isomeric benzyl o-nitrobenzyl dithiocarbonate phenylhydrazones.* One form, from $PhNH.NHCS_2CH_2Ph$, $o\text{-}O_2NC_6H_4CH_2Cl$ and KOH, red, clustered needles, m. 67°; the other, from $PhNHNHCS_2CH_2C_6H_4NO_2$ and $PhCH_2Cl$, bright red columns, m. 88°. Both are sol. to the same extent in different solvents; if either is kept fused on the H_2O bath 1 hr. and allowed to crystallize from EtOH-Et_2O, both forms sep. out together in approx. equal amts. *p-Nitrobenzyl p-tolyldithiocarbazinate*, from the K salt and $o\text{-}O_2NC_6H_4CH_2Cl$, care being taken that the former is present in excess, yellow needles, m. 127°, sol. with dark red color in alc. KOH. At the same time is formed *p-nitrobenzyl dithiocarbonate p-tolylhydrazone*, $MeC_6H_4NHN : C(SCH_2C_6H_4NO_2)_2$, red needles, m. 116°. *o-Nitrobenzyl p-tolyldithiocarbazinate*, yellow needles turning green after a time, m. 147°. *o-Nitrobenzyl dithiocarbonate p-tolylhydrazone*, hair-like, golden yellow felted needles, m. 134°. From these carbazine esters the following *p*-tolylhydrazones were prepared by treatment with the calc. amt. of K_2CO_3 in aq. alc. to form the salt $MeC_6H_4NHN : C(SR)SK$ and then with an alkyl halide. It is assumed that the alkyl of the carbazine ester used assumes the *anti* position to the hydrazone group, that of the halide the *syn* position. In the following, that alkyl which is made the reference group is marked with an (*). *Methyl* p-nitrobenzyl dithiocarbonate p-tolylhydrazones: Anti* (I), garnet-red needles, m. 115°, stable, remaining unchanged in b. alc. or when

$$\underset{O_2NC_6H_4CH_2SCSMe^*}{\overset{MeC_6H_4NHN}{\|}} \quad \text{(I)} \qquad\qquad \underset{{}^*MeSCSCH_2C_6H_4NO_2}{\overset{MeC_6H_4NHN}{\|}} \quad \text{(II)}$$

heated many hrs. above its m. p. *Syn* (II), glassy, golden yellow, clustered needles, m. 57°; when heated 1 hr. on the H_2O bath and recryst. from alc. it is completely transformed into the *anti* form. *Ethyl* p-nitrobenzyl dithiocarbonate p-tolylhydrazones: Anti*, red leaflets, m. 70°. *Syn*, red oil. *Benzyl* p-nitrobenzyl dithiocarbonate p-tolylhydrazones: Anti*, red clustered needles, m. 119°. *Syn*, red needles, m. 119°, which,

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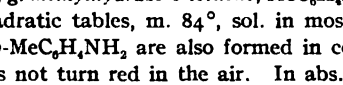
on dissolving in $CHCl_3$-EtOH and slowly evapg. the $CHCl_3$, seps. in garnet-red, quadrangular tables, m. 119°. On similar treatment, the *anti* form seps. in diamond-shaped tables, but of a brighter red color and m. somewhat higher, 120°. Both are monoclinic; they are apparently identical. *o-Nitrobenzyl* p-nitrobenzyl dithiocarbonate p-tolylhydrazones: Anti*, slender orange needles from alc., clustered orange columns from C_6H_6-ligroin, m. 124°. *Syn*, bright red columns from $CHCl_3$-EtOH, m. 80°. When heated 1 hr. on the H_2O bath, it is transformed to a large extent into the *anti* form; when the latter is heated 1 hr. at 135°, about half of it goes into the *syn* form. *p-Nitrobenzyl p-bromophenyldithiocarbazinate*, long, bright yellow, transparent needles, m. 135–6°. *Di-p-nitrobenzyl dithiocarbonate p-bromophenylhydrazone*, red needles, m. 132°. *o-Nitrobenzyl p-bromophenyldithiocarbazinate*, needles, m. 156-7°. *Di-o-nitrobenzyl dithiocarbonate p-bromophenylhydrazone*, bright red, felted needles, m. 119°. *Methyl* p-nitrobenzyl dithiocarbonate p-bromophenylhydrazones: Anti*, red prisms, m. 120–1°. *Syn*, red prisms, m. 119°, identical with the *anti* form, monoclinic, augite-like prisms, $\infty P \infty P \infty$. *o-Nitrobenzyl* p-nitrobenzyl dithiocarbonate p-bromophenylhydrazones: Anti*, golden yellow needles in spherical clusters, m. 113–4°. *Syn*, slender, orange, felted needles, m. 107°. Each is about half transformed into the other on heating above its m. p. *Methyl* ethyl dithiocarbonate benzoylphenylhydrazones: Anti*, limpid columns, m. 93°. *Syn*, needles, m. 83–4°. When either is heated above its m. p., equil. between the 2 forms is established. CHAS. A. ROUILLER.

Origin of Cork. S. ZEISEL. Chem. Lab. k. k. Hochschule Bodenkultur Wien. *J. prakt. Chem.*, 84, 317–23.—Criticism of the work of Schmidt (*C. A.*, 5, 1747). C. A. R.

Oxidizing Action of Dilute Nitric Acid in Sunlight. ALFRED BENRATH. Chem. Lab., Univ. Königsberg i/Pr. *J. prakt. Chem.*, 84, 324–8; cf. *C. A.*, 5, 3458.—Various aliphatic acids (AcOH, $H_2NCH_2CO_2H$, $EtCO_2H$, $PrCO_2H$, Me_2CHCO_2H, malonic, succinic, pyrotartaric) were dissolved in 2 *N* HNO_3 containing a little $Fe(NO_3)_3$ and exposed to sunlight. In all cases, N_2O, a little CO_2, HCHO and (except with AcOH) much HCN were obtained. Propionic and succinic acids gave an aldehyde, probably AcH; isobutyric acid yielded Me_2CO. The solns. assumed a cherry-red color, probably due to hydroxamic acid formation (cf. Baudisch, *C. A.*, 5, 2826). These facts are in harmony with Baudisch's views that N assimilation is a light reaction. C. A. R.

Hydrazo Compounds. VII. Methylhydrazotoluene, Methyltolidine and Ethylbenzidine. BERTHOLD RASSOW AND ARNO BECKER. Techn. Abt. chem. Univ.-Lab., Leipzig. *J. prakt. Chem.*, 84, 329–52; cf. *C. A.*, 6, 76.—(o-$MeC_6H_4NH)_2$, m. 156°, not 165°, can be methylated by means of Me_2SO_4 in the presence of MgO in C_6H_6, but it requires much longer b. and twice as much of the Me_2SO_4 and MgO as is necessary in the case of Ph_2N_2. Thus, 20 g. (o-$MeC_6H_4NH)_2$, 15 g. MgO and 30 g. Me_2SO_4, b. 30-40 hrs. in 200 g. C_6H_6, gave 5.5 g. *methylhydrazo-o-toluene*, $MeC_6H_4NHNMeC_6H_4Me$, rhombic, rectangular, or almost quadratic tables, m. 84°, sol. in most org. solvents but insol. in H_2O. (o-$C_6H_4N)_2$ and o-$MeC_6H_4NH_2$ are also formed in considerable amts. When once obtained pure, it does not turn red in the air. In abs. alc. HCl (d. 1.19) transforms it into *methyltolidine* (I), m. 85°, stable when dry, but when moistened or on



(I)

long standing of the soln. it turns deep blue. *Hydrochloride*, $C_{15}H_{18}N_2.2HCl$, decomp. 260–80°, becomes blue and finally dirty green on long standing in H_2O. *Chloroplatinate*, $C_{15}H_{20}N_2.PtCl_6$, brownish yellow ppt., very unstable. *Picrate*, microscopic needles, decomp. 184–6°. With BzCl and KOH, the base gives *dibenzoylmethyltolidine*, BzNH-

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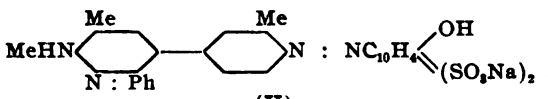
$C_6H_3MeC_6H_3MeNMeBz$, microscopic needles, m. 156°; with *o*-HOC_6H_4CHO in abs. alc. is obtained the *compound* $MeNHC_6H_3MeC_6H_3MeN : CHC_6H_4OH$, needles, m. 120°, sol. in cold dil. H_2SO_4 without change, but on b. the compd. is split into its components. When the hydrochloride was treated with a little more than the calc. amt. of $NaNO_2$ for the formation of the *diazonium salt*, $MeNHC_6H_3MeC_6H_3MeN_2Cl$, the soln. gave a test for free HNO_2, but on standing the excess of HNO_2 disappeared, and only when 2 mols. $NaNO_2$ had been added was a permanent test with KI-starch paper obtained, showing that the *compound* $ONNMeC_6H_3MeC_6H_3MeN_2Cl$ had been formed, but that the *o*-Me group had protected the MeNH group from being instantly attacked. This was confirmed by the prep. of the following compounds: *Methyl-o-tolidineazo-β-naphthol*, $MeNHC_6H_3MeC_6H_3MeN_2C_{10}H_6OH$, from the hydrochloride, 1 mol. $NaNO_2$ and β-naphthol, gleaming, dark red crystals, m. 90–2°, decomp. 120°, sol. in conc. acids, insol. in alks. *Methylnitroso-o-tolidineazo-β-naphthol*, obtained when 2 mols. $NaNO_2$ were used, m. 173°, more intensely colored than the preceding compd., insol. in conc. HCl; b. a long time with alc. HCl, it gives the above methyltolidineazonaphthol. *Methyltolidineazodimethylaniline*, dark brown crystals, decomp. about 100°, insol. in alks., sol. in conc. acids. *Hydrochloride*, dark red powder. *Methylnitroso-o-tolidineazodimethylaniline*, reddish yellow triclinic crystals, extinction of 8° to 16° on the vertical faces, pleochroitic (deep blood-red lengthwise and carmine-red crosswise), m. 160°, decomp. 180°; alc. HCl converts it into the preceding compd., but much more slowly than is the case with the β-naphthol deriv. *Disodium methyl-o-tolidineazo-β-naphtholdisulfonate*, changes about 200° without distinct decomp., sol. in H_2O and acids, insol. in alks. The azodimethylaniline deriv. combines with PhN_2Cl to form the *compound* $MeNHC_6H_2Me(N_2Ph)C_6H_3MeN_2C_6H_4NMe_2$, brown ppt., decomp. 180–90°; the azonaphtholdisulfonate gives the *compound* (II), dark red, decomp.



(II)

about 250°. The azodisulfonate likewise forms a deep bluish violet dye with diazotized *p*-$H_2NC_6H_4SO_3H$. Dyeing expts. on non-mordanted cotton showed that the introduction of a 2nd diazo group into the azo compds. produced a marked increase in coloring power and a shifting of the shade towards the blue. From $(PhNH)_2$ and Et_2SO_4 was obtained, in very small amt., *ethylbenzidine*, m. 73–4°. C. A. R.

Chrysophanic Acid, Frangula Emodin and some Oxonium Compounds of Anthracene Derivatives. IX. O. Fischer and H. Gross. Chem. Lab., Univ. Erlangen. *J. prakt. Chem.*, **84**, 369–82; cf. *C. A.*, **5**, 2649.—In the prep. of chrysophanic acid from chrysarobin, the demethylation of the com. product by HI need not be carried out under pressure; it is much more easily effected by passing an excess of gaseous HI through a b. glacial AcOH soln. of the substance. Another method of prep. consists in oxidizing the crude chrysarobin and sepg. the mixt. of chrysophanic acid and methylemodin either by demethylating with conc. HCl in glacial AcOH under pressure and treating with Na_2CO_3, or by completely methylating with Me_2SO_4 and crystallizing from AcOEt. Dibenzoylchrysophanic acid, from chrysophanic acid in pyridine and BzCl, m. 212°, is oxidized by CrO_3 in glacial AcOH and Ac_2O to *dibenzoylrhein*, yellow prisms grouped in stars, m. 253–5°, which is hydrolyzed by alc. KOH to rhein, m. 321°. Heated on the H_2O bath 3–5 hrs. with 15 pts. NH_3 under 50 mm., chrysophanic acid yields a *compound* $C_{15}H_{11}O_3N$, spherical clusters of needles, assuming a bronze luster on drying, sol. with reddish violet color in alks. and NH_3, with orange color in conc. H_2SO_4 and gradually passing back into chrysophanic acid when b. with 20% NaOH.

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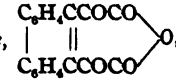
The compd. must therefore be an imide, as originally assumed by Lieberman and Fischer, and not an amino compd. (Oesterle and Johann, *C. A.*, 5, 481). Triacetylemodin is oxidized by CrO_3 in glacial AcOH and Ac_2O to *triacetylemodinic acid*, $C_{21}H_{14}O_{10}$, needles, grouped in stars; alk. KOH hydrolyzes it to *emodinic acid* (trihydroxy-β-anthraquinonecarboxylic acid), orange-yellow needles, evolves red vapors 340–50°, decomp. completely 360°, easily sol. in alks. with reddish violet color, in conc. H_2SO_4 with yellowish eosin color, forms a violet lack with $Ba(OH)_2$, very stable, being practically unchanged by heating at 190° with conc. HCl and glacial AcOH. Neither anthracene, methyl- or chloroanthracenes, anthraquinone, the 2 methylanthraquinones, dimethyl- or diethylhydroanthraquinones gave oxonium salts with conc. HBr or 60–70% $HClO_4$; hydroxyanthraquinones form yellowish red to red solns, but even rufigallic acid yielded no salt which could be isolated. The Me and Et ethers of hydroxyanthraquinones, however, did give such salts under certain conditions. *Hexamethylrufigallic acid*, $C_{20}H_{20}O_8$, from the K salt and Me_2SO_4 at 120°, light yellow needles, m. 240°. Trimethylemodin in $CHCl_3$ gives with dry HBr the *oxonium salt* $C_{18}H_{17}O_5Br$, red ppt., loses HBr overnight in a desiccator. The *zinc bromide double salt*, $C_{18}H_{17}O_5Br_2Zn$, red crystals, is somewhat more stable. *Perchlorate*, $C_{18}H_{17}O_9Cl$, scarlet-red cryst. powder. *Dimethylchrysophanic acid bromide*, scarlet flocks, stable only under the liquid from which it is pptd.; *zinc bromide salt*, $C_{17}H_{15}O_4Br_2Zn$, cinnabar-red flocks. *1,8-Dimethoxyanthraquinone bromide*, scarlet-red flocks; *zinc bromide salt*, $C_{16}H_{13}O_4Br_2Zn$. The corresponding chlorides and $ZnCl_2$ salts can be similarly prepared, but they are even more unstable than the bromides. CHAS. A. ROUILLER.

Acylated Phenanthrenes and some of their Derivatives. C. WILLGERODT AND BRUNO ALBERT. Freiburg i/Br. *J. prakt. Chem.*, 84, 383–94.—*9-Acetylphenanthrene*, from phenanthrene and AcCl in CS_2 in the presence of $AlCl_3$, leaflets with bluish fluorescence, m. 123°. *Phenylhydrazone*, light yellow leaflets, m. 181°. *Oxime*, leaflets, m. 80°. Treated with 2 pts. CrO_3 in glacial AcOH, the acetylphenanthrene yields a *phenanthrenequinone*, $C_{14}H_8O_2$, leaflets with golden luster, m. 204–5°, whereas with 3–5 pts. CrO_3 is obtained the isomeric quinone, needles of a more orange color, already described in the literature. The former dissolves in conc. H_2SO_4 with a green color, turning red on the addition of H_2O and finally pptg. in yellow flocks which, on crystn. from alc., give the latter. Long b. with alc. KOH effects the same transformation, while short heating (15 min.) at 180° does also to some extent. The reverse change could not be obtained. B. and f. p. detns. show that both have the same mol. wt. Both give phenanthrophenazine, m. 219–20°, with $C_6H_4(NH_2)_2$ (Hinsberg, *Ann.*, 237, 340). Heated 6 hrs. at 170–80° with 5–6 pts. yellow NH_4 sulfide, the acetyl compd. gives *9-phenanthreneacetic acid*, needles, m. 213–5°, and the *amide*, leaflets, m. 250–2°. *Silver salt*, yellow, gelatinous ppt. From the acetyl compd. and PCl_5 is obtained *9-dichloroethylphenanthrene*, $C_{14}H_9CCl_2Me$, yellow needles, decomp. 80–100°, easily turns dark in the light. Zn dust and glacial AcOH reduce the acetyl deriv. to $C_{14}H_9CHMeOH$ (Pschorr, *Ber.*, 39, 3128). Heated 6 hrs. at 180–5° with HI (d. 1.7) and a little red P, the acetyl compd. forms *9-ethylphenanthrene*, needles, m. 61°. *9,10-Diacetylphenanthrene*, from 30 g. phenanthrene, 40 g. $AlCl_3$ and 45 g. AcCl in a little CS_2, white needles with greenish fluorescence, m. 178°; it is oxidized by CrO_3 to phenanthrenequinone. *Phenylhydrazone*, m. 189°. *Diphenylhydrazone*, yellow needles, m. 238°. *Diketoxime*, leaflets, m. 258–60°. The diacetyl compd. is oxidized by CrO_3 to *9,10-phenanthrenediketodicarboxylic anhydride*,  , light yellow powder, m. 360°; on fusion with 1,3-$C_6H_4(OH)_2$, it exhibits dark red fluorescence. *Silver salt*, $C_{14}H_8(COCO_2Ag)_2$, from an NH_3 soln. of the anhydride and $AgNO_3$,

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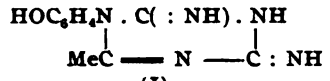
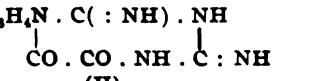
yellow ppt. Zn dust in AcOH reduces the diacetyl compd. to *9,10-phenanthrylenedimethyldicarbinol*, $C_{14}H_8(CHMeOH)_2$, leaflets, m. 165–6°. *9,10-Bis-(dichloroethyl)-phenanthrene*, $C_{14}H_8(CMeCl_2)_2$, yellow leaflets, decomp. 130–40°. *9,10-Diethylphenanthrene*, leaflets, m. 90–1°. *9-Benzoylphenanthrene*, needles, m. 127°; distilled with Zn dust in H, it gives *9-benzylphenanthrene*, leaflets, m. 91–2°. *9,10-Dibenzoylphenanthrene*, leaflets, m. 317°; heated 6 hrs. with HI (d. 1.7) at 180–90°, it yields *9,10-dibenzylphenanthrene*, needles, m. 180–2°. CHAS. A. ROUILLER.

Biguanides. GEORG COHN. *J. prakt. Chem.*, **84**, 394–409.—Phenylbiguanide, obtained by b. 8.4 pts. dicyanodiamide and 14 pts. $PhNH_2.HCl$ in 28 pts. H_2O for 0.5 hr. and treating the resulting salt with KOH, m. 144–6°; hydrochloride, sol. in 115 pts. H_2O at 16°; picrate, m. 176–9°. *m-Nitrophenylbiguanide*, yellow prisms with 1 EtOH, m. 108–18° and (after removal of the EtOH at 80°) m. 147–9°; *hydrochloride*, yellow, spherical aggregates; *picrate*, yellow ppt., m. 210–1°. *p-Hydroxyphenylbiguanide*, needles with 2 H_2O, effloresce 100°, turn brown above 200°, decomp. 211°; hydrochloride, m. 203°; *picrate*, yellow, powdery ppt., m. 205–6°. B. Ac_2O and NaOAc transform the base into a *compound*, m. 236–7°, easily sol. in hot glacial AcOH, $PhNO_2$ and 25% HCl, but repptd. by NaOH only after a considerable interval. It is probably an acetyl deriv. of the compd. (I). *p-Phenetylbiguanide*, leaflets, m. 170–2° (de-

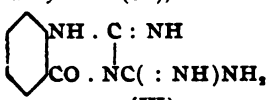


(I)



(II)

comp.); the cryst. form differs widely according to the solvent used; hydrochloride, sol. in about 20 pts. H_2O at 20°; *picrate*, yellow ppt., m. 186–9°. When dissolved in conc. H_2SO_4 and, after a time, poured into H_2O, the hydrochloride gives a *compound*, probably $EtOC_6H_4NHCONHC(:NH)NH_2$, spherical aggregates, m. 225–6°. With $(CO_2Et)_2$, the biguanide gives the *compound* (II), m. 195–6°; with *o*-HOC_6H_4CHO, a *compound* m. 148° (decomp.), easily sol. in cold, very dil. NaOH; with Ac_2O and NaOAc, the *diacetyl derivative*, $C_{16}H_{19}O_3N_5$, of the Et ether of (I), faintly yellow, powdery ppt., m. 176–8°. *Ethyl phenylbiguanide-p-carboxylate*, blocks, m. 177–8°, or feathery, broad pointed leafs with 1 H_2O, m. 173°; *hydrochloride*, leaflets or prisms; *picrate*, yellow ppt., m. 196–7°. *α-Naphthylbiguanide*, large, colorless leaves or shimmering leaflets, m. 154–5°; *hydrochloride*; *picrate*, egg-yellow ppt., m. 200–3°. *m-Phenylenedibiguanide*, m. 168–9°; *picrate*, m. 208–10°. *Diphenyldibiguanide*, from 15 g. benzidine, 22 g. of 25% HCl and 13 g. dicyanodiamide, m. 237°; it condenses with *o*-HOC_6H_4CHO to form a *compound* m. 185–7°. *Aminodiphenylbiguanide*, from 18.4 g. benzidine, 14.4 g. of 25% HCl and 8.4 g. dicyanodiamide in 60 cc. H_2O, m. 203–4°. *Phenylbiguanide-o-carboxylic anhydride* (III), from *o*-$H_2NC_6H_4CO_2H$ and dicyanodi-



(III)

amide, cryst. powder; *hydrochloride*. *Phenylmethylbiguanide*, hygroscopic needles. Guanazoles can be obtained like the above biguanides by using hydrazines instead of anilines. Phenylguanazole, m. 174–5°; picrate, m. 225°. CHAS. A. ROUILLER.

Method of Reducing Hydroaromatic Compounds. VICTOR SKVORTZOV. *J. prakt. Chem.*, **84**, 422–4.—Menthone and pulegone were reduced practically quant. to a mixt. of liquid and solid menthols by dissolving in 10 pts. MeOH or EtOH, adding somewhat more than twice the calc. amt. of Na, sealing up in an autoclave and shaking until the app. had again cooled down to room temp. The method does not seem to be applicable to unsatd. hydrocarbons and alcs. CHAS. A. ROUILLER.

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Hypobromous Amides. Étienne Boismenu. *Compt. rend.*, **153**, 678–80.—*Propionic bromoamide*, EtCONHBr, prepared by François' method (*C. A.*, **3**, 1163). *Benzoic bromoamide.* AcNPhBr is so unstable, if formed, that it cannot be isolated. *Formic br moamide*, obtained by the action of nascent HOBr (from Br and Ag_2O in AcOEt) on $HCONH_2$, white, unstable crystals, m. 87–8°. Unlike AcNHBr, these substances sep. without H_2O. The Br retains its hypobromous character (decolorizes indigo, decomp. KI, oxidizes As_2O_3), and these compds. are beyond doubt hypobromous amides. Chas. A. Rouiller.

New Derivative of Urea: Chlorourea. A. Béhal and A. Detoeuf. *Compt. rend.*, **153**, 681–3.—When 1 at. Cl is passed over cold urea, the mass becomes pasty and, when dissolved in H_2O, is colorless, has an odor like HOCl, replaces I in iodides and is acid. A quant. study of the last 2 reactions shows that a mixt. of the comp. $H_2NCONHCl + H_2NCONH_2.HCl$ has been formed, but all efforts to sep. the chlorourea by means of org. solvents failed. Pure *chlorourea*, however, is obtained by passing 32 g. HCl into 60 g. urea in 13 cc. H_2O in an ice bath and cooling in MeCl. It m. 71°, is sol. in 5 pts. H_2O; the soln. slowly evolves N and biuret is formed. The Cl in it reacts towards iodides and SO_2 like HOCl. Towards satd. org. compds. it reacts either as a chlorinating or as an oxidizing agent, sometimes as both; with unsatd. compds. it forms either HOCl or chlorourea addition products. Chas. A. Rouiller.

Use of the Magnetic Field as a Test for Constitution. XI. P. Pascal. Fac. sci. Lille. *Bull. soc. chim.*, **9**, 868–73; cf. *C. A.*, **5**, 3803.—The magnetic properties of dyes are such as to indicate that the quinoid structure is not necessary in all cases to produce color; that in certain cases we have to deal with a mixt. of tautomeric compds. Thus, the magnetic susceptibilities of aminoazobenzene and -toluene and of chrysoidine agree with those calc. for the pure azo structure. Similarly, the values for the yellow crystals of *p*-azoanisole and phenetole obtained by evapg. their solns. in the cold agree with the calc. for the azo form, whereas if the fused substances are cooled quickly red crystals are obtained and the magnetic susceptibilities agree with the calc. for the quinoid form; the slower the cooling, the yellower the crystals and the closer do the magnetic susceptibilities approach the values calc. for the pure azo form. Etherification of these compds. makes them revert to the azo form. Aurin seems to have the quinoid structure. Hantzsch's views as to the structures of the white and red Ag salts of $2,4,6\text{-}Br_3C_6H_2OH$ are confirmed by their magnetic properties.
Chas. A. Rouiller.

By-products in the Hydrolysis of Crude Pinacol. M. Delacre. *Bull. soc. chim.*, **9**, 885–9; cf. *C. A.*, **5**, 2095.—The fraction b. 214° of the products of hydrolysis of crude pinacol by H_2SO_4, although having approx. the comp. of isophorone, is really a mixt. By Harries and Hübner's method (*Ann.*, **296**, 310), it gives 2 oximes, m. about 60° and 88°, resp.; by Rübel's method (*Diss.*, Bonn, 1896), an oxime m. 161°. It forms a semicarbazone m. 187°, and combines partially with $NaHSO_3$. A fraction b. 60–3°, which has the comp. C_7H_{14}, vapor d. 3.75 (Hofmann's method), and absorbs 1.6 pts. Br, is also obtain d. Chas. A. Rouiller.

By-products in the Hydrolysis of Pure Pinacol. M. Delacre. *Bull. soc. chim.*, **9**, 889–98; cf. preceding abstr.—The by-products seem to be the same as the corresponding fractions of the same b. p. obtained from crude pinacol. C. A. R.

Catalytic Dehydration of Secondary and Tertiary Pinacolic Alcohols. F. Couturier. *Bull. soc. chim.*, **9**, 898–901.—$Me_3CCHMeOH$ is converted practically quant. into pinacolone when passed overr educed Cu at 300°. At 315°, Me_2CHCMe_2OH gives chiefly $CH_2 : CMeCHMe_2$ and a little $Me_2C : CMe_2$, thus confirming Delacre's views as to the mechanism of the dehydration. These expts. also show that heat has no isomerizing influence on the 2 alcs. at the moment of dehydration. Chas. A. Rouiller.

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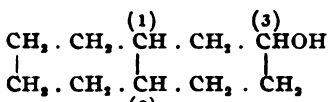
Sulfur and Nitrogen Compounds Derived from Carbon Disulfide. XVIII. Chlorothiocarbonic Esters. XIX. Thio Esters—Thionic Esters or Salts. MARCEL DELÉPINE. École sup. pharm., Paris. *Bull. soc. chim.*, **9**, 901–3, 904–8.—The following compds. were prepared from the alcs. and $CSCl_2$ (Klason, *Ber.*, **20**, 2384). *Methyl chlorothiocarbonate*, ClCSOMe, b. 107–8°, d_4^0 1.2975, d_4^{22} 1.2686. Ethyl ester, b. 127–8°, d_4^0 1.2138, d_4^{15} 1.1955. *Propyl ester*, b. 148–51°. They are pale yellow, pungent liquids; fume in the air, not owing to moisture, as H_2O attacks them only very slowly, but owing to oxidation to SO_2; are luminous in the dark. With Grignard reagents, they give the following compds., all of which but the last 2 being oxyluminescent; the intensity of the light emitted decreases with increasing mol. wt. *Methyl methylthioformate*, MeCSOMe (also obtained by Matsui's method, *C. A.*, **3**, 2697), b. 87–9°, d_4^0 1.0075, d_4^{21} 0.9842, n_D^{23} 1.46062. MeCSOEt, b. 109–10°, d_4^0 0.9816, d_4^{19} 0.9618, n_D^{19} 1.46389. EtCSOEt, b. 130–2°, d_4^0 0.9639, d_4^{19} 0.9451, n_D^{19} 1.46281. *Methyl isobutylthioformate*, b. 145–8°, d_4^0 0.9577, d_4^{15} 0.9436, $n_D^{12.5}$ 1.46727. *Ethyl ester*, b. 160–5°, d_4^0 0.9549, d_4^{15} 0.9414, $n_D^{12.5}$ 1.45569. *Methyl isoamylthioformate*, b. about 170°. *Methyl phenylthioformate*, b_{10} 110–2°. *Methyl cyclohexylthioformate*, b_{12} 90–100°. *Methyl octylthioformate*, b_{12} 115–20°. CHAS. A. ROUILLER.

Two Forms of Decahydro-β-naphthol. Special Case of Stereochemistry. LUIGI MASCARELLI. *Atti accad. Lincei*, **20**, II, 223–7.—A sample of decahydro-β-naphthol prepared by hydrogenation of the naphthol under pressure in the presence of Ni (Ipatiev, *C. A.*, **1**, 1698), on standing 1.5 yrs. in the dark, changed from a white, transparent cryst. substance to a yellowish mass formed of 2 layers, a pasty solid and a dense oil. The mixt. was fractionated into 2 portions $b_{23\cdot4}$ 135–6° and 136–7°, resp., and by repeated crystn. of these were obtained flattened, transparent crystals, m. 75°, and downy, thread-like, prismatic crystals, m. 103°. Analyses, mol. wt. detns. and equal stability towards $KMnO_4$ showed that both were decahydronaphthol,



This compd. contains 3 asym. C ats. (1, 2 and 3 in the formula) and theoretically there are 8 possible stereoisomers, *viz.*,

C 1.....	+	+	—	—	+	+	—	—
C 2.....	+	+	—	—	—	—	+	+
C 3.....	+	—	+	—	+	—	+	—
	a	*b*	*c*	*d*	*e*	*f*	*g*	*h*

But C ats. (1) and (2) form part of 2 rings, and therefore must have opposit configuration, otherwise one of the rings would be contorted, *i. e.*, would not lie in a plane, and so far the no. of isomers of homocyclic compds. known indicate that other than plane rings do not exist. Therefore the forms *a–d* are excluded, and of the remaining 4, *e* and *h* on the one hand and *f* and *g* on the other are optical antipodes. The 2 decahydronaphthols above are therefore probably the racemic mixts. corresponding to these pairs of antipodes. Which of the isomers is formed depends upon which way the central double bond in the naphthol is broken on hydrogenation. C. A. R.

Phototropy in Furfural Hydrazones. L. SANTI. Lab. chim. gen. r. univ. Bologna. *Atti accad. Lincei*, **20**, II, 228–30.—Furfural phenylhydrazone, m. 96°, non-phototropic; *α-naphthylhydrazone*, canary-yellow prisms, m. 110–5°, non-phototropic; *β-naphthylhydrazone*, light yellow needles, m. 137°, phototropic, slowly assuming a pink color in sunlight which it loses in the dark or on heating to about 120°; *p-tolylhydrazone*, light yellow cryst. powder, m. 100°, feebly phototropic, turning pink in

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sunlight and again losing the color when heated to 70–5°. A heterocyclic 5-at. ring, therefore, does not prevent phototropy, although it is less marked than in the corresponding BzH compds. As found by Padoa and Graziani (*C. A.*, **5**, 277) for aromatic compds., *o*-substituents in the hydrazine group prevent phototropy. C. A. R.

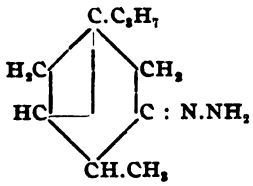
Angeli-Rimini Aldehyde Reaction. L. BALBIANO. *Atti accad. Lincei*, **20**, *I*, 245–9.—Answer to the criticisms of a pupil (*Rend. accad. Lincei*, **1911**, 940). Anisyl ketone, *p*-$MeOC_6H_4CH_2Ac$, gives the Angeli-Rimini reaction; therefore the reaction is not, as B. formerly believed, characteristic and distinctive for aldehydes. The isomeric ketone, $MeOC_6H_4COEt$, does not give the reaction, however. As the allyl chain, $CH_2CH : CH_2$, is transformed by alkalies into the propenyl chain, CH : CHMe, B. believes that anisyl ketone gives the reaction because it can pass into an enol form, $MeOC_6H_4CH : CMeOH$, while its isomer cannot. CHAS. A. ROUILLER.

Basicity of Organic Acids Containing Alcoholic Hydroxyl Groups. G. CALCAGNI AND L. BERNARDINI. Ist. chim. r. univ. Roma. *Atti accad. Lincei.*, **20**, II, 261–6; cf. *C. A.*, **5**, 1586.—The elec. cond. at 25° of 1, 2, 4, 8 and 16 *N* solns. of glycolic, lactic, α-hydroxybutyric and isohydroxybutyric acids containing 0–2.5 mols. NH_3 per mol. of acid has been detd. The curves show a minimum in the neighborhood of 0.2–0.3 mol. NH_3, and above 1 mol. NH_3 the cond. remains practically const. The bearing of these results is (apparently) reserved for a subsequent communication. CHAS. A. ROUILLER.

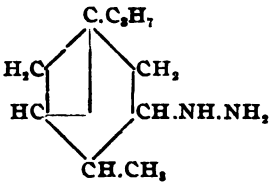
Racemization. J. GADAMER. *Chem. Ztg.*, **34**, 1004. J. J. M.

Decomposition of Organic Bases by Moderate Reduction. H. EMDE. *Chem. Ztg.*, **34**, 1005–6. J. J. M.

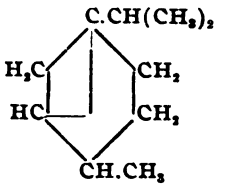
Action of Hydrazine Hydrate on Thujone. N. KIZHNER. Org. Lab., Techn. Inst., Tomsk. *J. Russ. Phys. Chem. Soc.*, **42**, 1198–1204.—By the author's general method thujone was converted into the bicyclic thujone (II). *Thujylideneazine* (I)



(I)



(II)



(III)

was made by treating thujone with excess of $(NH_2)_2.H_2O$; colorless liquid of mild odor; b_{25} 149°; d_0^{22} 0.9504; n_D^{22} 1.4952; $[\alpha]_D$ = 123.75°; reduces an NH_3 soln. of Ag_2O; sol. in dil. HCl, but soln. soon becomes turbid from sepn. of thujone. The thujone obtained in this way b_{739} 202–3.5°, and is inverted, having α = 33.36. *Thujylhydrazine* (II) was made by action of Na in hot alc. on (I) and distilling with steam; b_{30} 142–4°; b_{741} 242–4°; d_0^{20} 0.9302; n_D^{20} 1.48; $[\alpha]_D$ = 76.67; thickens on cooling; oxidizes in the air; reduces NH_3 soln. of Ag_2O in presence of alkali; gives with Ph.NCS a *phenylthiosemicarbazide*, $CS(NHNHC_{10}H_{17})(NHPh)$; needles, m. 134–5°; $[\alpha]_D$ = 51.39° (in $CHCl_3$). (III) was made by oxidizing (II) with $K_3Fe(CN)_6$ + KOH; b_{741} 157.5–58°; d_0^{20} 0.8164; n_D^{20} 1.4398; $[\alpha]_D$ = 53.51°; has odor of turpentine; gives an unstable *bromide* with Br; with conc. HBr a *bromide* is obtained which on b. with K_2CO_3 yields an unsatd. *hydrocarbon*, $C_{10}H_{18}$; 162–5°; d_{20}^{20} 0.8138; n_D^{20} 1.4512; α = 3.32° H. M. GORDIN.

Cyclobutyldiphenylcarbinol and its Transformations. N. KIZHNER. Lab. Org. Chem. Techn. Inst. Tomsk. *J. Russ. Phys. Chem. Soc.*, **42**, 1227–36.—Cyclobutyldiphenylcarbinol (I) was made by Grignard's method from the Et tetramethylene-

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carboxylate and PhI; rhombs, b_{13} 198°; d_{04}^{20} 1.0906; n_D^{20} 1.5882; gives yellow soln. in conc. H_2SO_4, and blue ring with a layer of H_2SO_4; gives with HBr a *bromide*, $C_{17}H_{17}Br$; m. 94.5–95°. *Cyclobutylidenediphenylmethane*, (II), was made from (I) by heating

$CH_2.CH.C(OH).Ph_2$ (I) $\quad CH_2.C:CPh_2$ (II) $\quad CH_2CH.CPh_2Br$ (III) $\quad CH_2.CBr.CPh_2Br$ (IV)

with $(CO_2H)_2$; m. 58°; gives yellow soln. in H_2SO_4 and violet ring with layer of H_2SO_4; is oxidized by CrO_3 to Ph_2CO, and by HNO_3 to Ph_2CO and succinic acid; by reduction with HI it changes to what is probably an isomeric *hydrocarbon*; m. 65°. The bromide (III) was made by action of HBr on (II); m. 94–5°. The *dibromide* (IV) was made by action of Br on (II), m. 91–2°; loses HBr on b., changing to (V) *diphenylbromocyclobutylcarbinyl methyl ether* m. 81–1.5°. *Diphenylbromocyclobutylmethane* (VI) was made

$CH_2.CBr.C(OCH_3)Ph_2$ (V) $\quad CH_2.CH.CHPh_2$ (VI)

by reducing (II) with Na + EtOH, m. 39.5°; $d_0^{43.5}$ 1.0003; $n_D^{43.5}$ 1.5636; is changed by cold strong HNO_3 into *dinitrodiphenylcyclobutylmethane*. On boiling (VI) with dil. HNO_3 and reducing the product with Sn + HCl, β-benzopinacolin is formed, which b. KOH in alc. decomposes into BzOH and Ph_2CH. H. M. GORDIN.

Catalytic Reduction of Unsaturated Organic Compounds. (Preliminary Communication.) S. FOKIN. *J. Russ. Phys. Chem. Soc.*, **42**, 1074–7.—As an explanation of why H in presence of Ni_2O_3 is a better reducing agent at high temps. and pressures than in presence of Ni (Ipatev), it is assumed that under these conditions a metallic hydroxide is formed, and that the latter forms with the unsatd. compd. a complex which serves as an H carrier. This is corroborated by the fact that on passing H through a suspension of the hydroxide in the unsatd. compd. the hydroxide goes into soln.
H. M. GORDIN.

Isomerization of some Phosphorus Compounds. II. A. E. ARBUZOV. New Alexandria. *J. Russ. Phys. Chem. Soc.*, **42**, 549–61.—Compounds of the type $Ph_2P(SR)$, in analogy with those of the type $Ph_2P(OR)$ (*C. A.*, **5**, 1397), easily isomerize to the type Ph_2RPS. *Ethyl diphenylthiophosphinite*, $Ph_2P(SET)$, was made from EtSNa and Ph_2PCl. Oil, b_{12} 196.5–7°; d_0^0 1.133; combines with cuprous halides. As by-product a small amt. of Ph_2 was obtained. When warmed to 100° with EtI it isomerizes to *diphenylethylphosphine sulfide*, Ph_2EtPS; rhombic plates, m. 65.5–66°; easily sol. in Et_2O. As by-products are formed: Ph_2Et_2PI, m. 207–8°, giving a chloroplatinate, m. 202–3°. *Ethyl diphenyloxythiophosphinate*, $Ph_2PO(SEt)$, m. 72–3°, and $Ph_2PO(OH)$, m. 194–5°. *Isobutyl diphenylthiophosphinite*, $Ph_2P(SBu)$, was made by analogous method. Oil, b_8 200.5–1°; combines with CuI; isomerizes to *diphenylisobutylphosphine sulfide*, Ph_2Bu_2PS, when heated to 110° with isobutyliodide; rhombs, m. 80–1°; as a by-product *diphenyldiisobutylphosphonium iodide*, Ph_2Bu_2PI, m. 183–4°, was obtained. *Isoamyl diphenylthiophosphinite*, $Ph_2P(SAm)$, was made by analogous method. Oil, b_{13} 219–20°; d_0^{17} 1.0645; combines with cuprous halides; isomerizes to *diphenylisoamylphosphine sulfide*, Ph_2AmPS, when heated to 120° with isoamyl iodide, rhombs, m. 63.5°; b_9 230–40°. *Propyl diphenylthiophosphinite*, $Ph_2P(SProp)$, could not be obtained pure. The crude product, made by above general method, isomerizes to *diphenylpropylphosphine sulfide*, $Ph_2(C_3H_7)PS$, when heated to 90° with C_3H_7I; m. 97–8°. H. M. GORDIN.

Action of Zinc and Magnesium Organic Compounds on Ethyl *o*-Formate. M. L.

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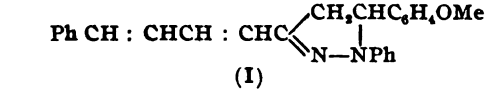
ZHDANOVICH. Organ. Lab., Univ. St. Vladimir. *J. Russ. Phys. Chem. Soc.* **42**, 1279–97.—On digesting a mixt. of $CH(OEt)_3$ and ethyl-α-bromoisobutyric acid with Zn and fractionating the product, *ethyl formyldimethylacetate acetal*, $Me_2C(CO_2Et)CH(OEt)_2$ (I), was obtained; b_{748} 211–2°; d_{19}^{19} 0.952; n_{19} 1.41886; is oxidized by N oxides to $Me_2C(CO_2H)_2$. On saponifying the crude product obtained in the prep. of (I), $(Me_2CH)_2CO$ was obtained which may owe its production to the intermediary formation of the Et ester of $Me_2CHCOC(Me_2)CO_2Et$. As by-product of (I) a *ketone ester*, $Me_2C.C(Me_2)CO_2Et$ / $OC.C(Me_2)CO_2Et$ (?), was obtained, together with metacrylic and tetramethylsuccinic acids (?). If Mg be substituted for Zn, the reaction is more energetic, and among the products are found: Of the *ethyl formyltetramethylacetoacetate acetal* (?), tetramethyl-β-hydroxyglutaric acid, a lactone of the latter, and $Me_2C(CO_2H)_2$. H. M. GORDIN.

Preparation of β-Iodoindole. ADOLF OSWALD. Agr. chem. Lab., Eidgen. Polytech., Zürich. *Z. physiol. Chem.*, **73**, 128–30.—Four cc. 10% aq. KOH are added to a soln. of 0.2 g. indole in 20 cc. 96% alc., and the mixt. dild. with H_2O till opalescent. On gradual addition while shaking of 0.43 g. I in aq. KI there seps. β-iodoindole, C_8H_6NI, snow-white scales, m. 72°. A. HUNTER.

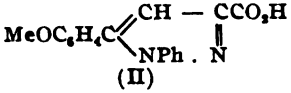
Chemical Action of Light. II. G. INGHILLERI. Inst. allgem. Chem., Kgl. Univ., Siena. *Z. physiol. Chem.*, **73**, 144–51; cf. *C. A.*, **5**, 2640.—Sealed glass tubes with contents as follows were exposed for long periods to the action of light: (1), 100 cc. 40% CH_2O; (2), 70 cc. CH_2O and 35 cc. H_2O; (3), 70 g. MeOH and 40% CH_2O; (4), 60 g. glycerol, 20 g. oxalic acid and a little H_2O. The products were: (1), Methylenitan (?); (2), 12 g. MeOH; (3), CH_2O_2 and probably HCO_2Me; (4), CH_2O_2 (?), butyric acid (3.5 g. in one case, 1 g. in another), and an oily liquid which was probably monobutyrin. A. HUNTER.

Pyrazoline Rearrangement of Unsaturated Hydrazones. H. BAUER AND H. DIETERLE. Lab. Pure and Pharm. Chem. Roy. Techn. Hochsch., Stuttgart. *Ber.*, **44**, 2697–702; see *C. A.*, **5**, 3831. — *1-Phenyl-3-cinnamalmethyl-5-anisylpyrazoline*, formula (I) below, is prepared by heating anisalcinnamalacetone and PhN_2H_3 with

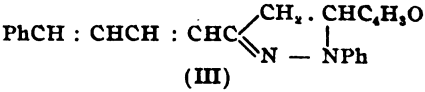


(I)

glacial AcOH, during 5 hrs., on a H_2O bath; yellow crystals from alc., m. 155–6°. The soln. in alc. exhibits an intense green fluorescence; in conc. H_2SO_4 the color is greenish yellow. The compd. gives Knorr's pyrazoline reaction. Warm, aq. $KMnO_4$ oxidizes (I) to BzOH and *1-phenyl-5-anisylpyrazole-3-carboxylic acid* (II); slender, white needles



(II)



(III)

from H_2O, m. 178–9°. *Copper salt*, slender, green needles from alc. *1-Phenyl-7-anisyl-6-bromo-7-methoxy-5-heptadieneonephenylhydrazone*, PhCH : CHCH : CHC(: NNHPh)CHBrCH(OMe)C_6H_4OMe, is prepared in a similar manner to (I); crystals from glacial AcOH, m. 201–2.5°. With Na–Hg it eliminates $PhNH_2$. *1-Phenyl-7-anisyl-3,4,6-tribromo-7-methoxy-5-hepteneonephenylhydrazone*, PhCH : CHCHBrCHBrC(: NNHPh)CHBrCH(OMe)C_6H_4OMe, is obtained in a similar manner to (I); slender, yellow needles from alc., m. 181–2°. It reacts with Na–Hg. *Benzalcinnamalacetonephenylhydrazone*, PhCH : CHCH : CHC(: NNHPh)CH : CHPh, prepared in alc. soln.; yellowish brown plates from alc., m. 111–2°. In conc. H_2SO_4 the color is carmosin-red. *Fur-*

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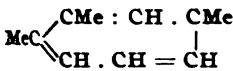
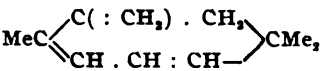
furalcinnamalactone, PhCH : CHCH : CHCOCH : CHC_4H_3O, from cinnamalacetone, furfuraldehyde, alc., H_2O and NaOH; lustrous, golden yellow plates from alc., m. 97–8°. In conc. H_2SO_4 the color is intensely red. *1-Phenyl-3-cinnamalmethyl-5-furylpyrazoline* (III), from the preceding compd., in glacial AcOH; slender, yellow needles from alc., m. 165–6°. Its solns. are highly fluorescent and it exhibits Knorr's pyrazoline reaction. Aq. $KMnO_4$ oxidizes it to BzOH and 1-phenylpyrazole-3,4-dicarboxylic acid, m. 250–5°. J. BISHOP TINGLE.

Tetramethylcycloheptatriene. H. RUPE AND W. KERKOVIUS. Univ. Lab., Basel. *Ber.*, **44**, 2702–13.—*Tetramethylcycloheptatriene*, formula (I) or (II) below, is prepared


(I)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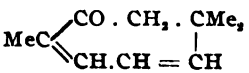
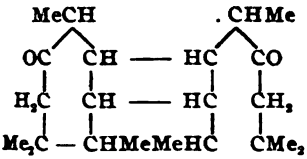
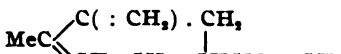
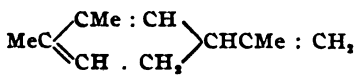

(III)

from MeMgI and eucarvone (III), the tert. alc. which is first formed eliminates H_2O at the H_2O bath temp. and the resulting hydrocarbon is purified by treatment with semicarbazine; colorless, mobil oil with an odor of camphor, b_{11} 67–7.5°; d_{20} 0.8687; n_D^{20} 1.50660; M_D 50.70; E M_D 1.33; E Σ_D 0.90. The compd. was not changed after 1 month in darkness. After b. during 1 hr. with aq. H_2SO_4 (10%) and alc. it is mostly unchanged and no C_6H_6 deriv. is produced. *Dihydrobromide*, $C_{11}H_{18}Br_2$, dark olive-colored oil, decomp. when distilled. When b. with amyl alc. and Na (I) or (II) is reduced to a mixt. of the di- and tetrahydro deriv., but with alc. + Na it gives the former only, *i. e.*, a *tetramethylcycloheptadiene*, $C_{11}H_{18}$; liquid, b_{12} 64.5–5.5°; d_{20} 0.8491; n_D^{20} 1.47643; M_D 49.89; E M_D 0.03; E Σ_D —0.02. The following isomeric compds. (A) and (B), which may be (IV), were obtained in the ratio 1 : 2, by adding a mixt.


(IV)


(V)

of (III) and MeI to Mg, in Et_2O; they were sepd. by recrystn. from alc. + gasoline (1 : 1). Yield, 6.9% of (III). (A) is the more sparingly sol.; white, flat, thin, monosymmetric plates, m. 177–8°; mol. wt., in freezing C_6H_6, 328. *Oxime*, $C_{11}H_{19}ON$, short, white, slender prisms from glacial AcOH, decomp. 265°. *Semicarbazone*, white, cryst. powder, decomp. 259°. (B) quadratic prisms, m. 142–3°; mol. wt., in freezing C_6H_6, 299. *Oxime*, $C_{11}H_{19}ON$, long, thin, quadratic prisms from alc., m. 204–5°. Some oxime of (A) is produced simultaneously. These results support the idea that methylmenthatriene contains 2 conjugated double linkage (V) or (VI). Cf. Auwers and


(VI)

Eisenlohr (*C. A.*, **5**, 505). J. BISHOP TINGLE.

Melamazine from Hydrazine Salts and Dicyanodiamine. K. A. HOFMANN AND OSKAR EHRHART. Inorg. Lab., Techn. Hochsch., Berlin. *Ber.*, **44**, 2713–7.—Aminoguanidine nitrate is best prepared by shaking during 12 hrs., at first at 0°, Ca cyanamine (50%) (100 g.), H_2O (400 cc.) and $N_2H_4.H_2SO_4$ (65 g.), the product is filtered and the liquid neutralized with HNO_3. Yield, about 40 g. *Melamazine*, $(C_3N_3NH_2)_2(NHNH)_3.H_2O$, is formed by heating a mixt. of dicyanodiamine (20 g.) with dry $N_2H_4.HCl$ (from

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25 g. of com. $N_2H_4.H_2O$) up to 280° and extracting the product with aq. HCl (1%); white powder. Yield, 14–5 g. *Hydrochloride*, $C_6H_8N_{12}.HCl$, white powder, decomp. by H_2O. At 170°, during 24 hrs., conc. HCl hydrolyzes it to CO_2, NH_3 and N_2H_4. At 190°, fuming H_2SO_4 converts it chiefly into melanurenic acid $(CN)_3NH_3(OH)_2$. When evap. with aqua regia it gives ammeline nitrate, $HOC_3N_3(NH_2)_2.HNO_3$. At the ordinary temp., with alk. "permanganate," melamazine evolves 4 ats. of N. With excess of "permanganate," on a b. H_2O bath, ammelide, $C_6H_9O_3N_9$, is produced. In alk. soln., air oxidizes melamazine to a bluish violet *dye*, which is best isolated as the *barium salt*, $(C_6HO_3N_{10})_2Ba$, by the use of $Ba(OH)_2$; violet-black powder with a dark bronze luster. It decomp. in air, gives violet solns. in aq. alkali hydroxides, or carbonates and developes a violet color on unmordanted cotton, after treatment of the fiber with $CaCl_2$ soln. The color changes to Corinth-red with acids. *Thallium salt*, deep greenish blue. Melamazine gives the following color reactions: In 100,000 parts of aq. alkali, on exposure to air, amethyst, which is discharged by reducing agents; in conc. H_2SO_4, with a little nitrate or nitrite, intense yellowish red, resembling that of brucine; when warmed, the soln. becomes blue, then discharges the color and evolves gas; in conc. H_2SO_4 + H_2O_2, reddish yellow; CrO_3 (+ conc. H_2SO_4 ?), deep brownish red, changing to green and evolving N when warmed. In alk. soln., melamazine gives, by prolonged exposure to air, a brownish red soln. from which HCl ppts. orange-colored flocks. After drying this *compound* is rusty brown; with alk. "permanganate" it evolves N. J. Bishop Tingle.

Ketonic-Enolic Tautomerism. III. Tautomerism of Acetoacetic Ester. Kurt H. Meyer and Paul Kappelmeier. Chem. Lab., Acad. Sci. Munich. *Ber.*, **44**, 2718–24; cf. *C. A.*, **5**, 2624 and L. Knorr, *C. A.*, **5**, 2836.—The authors have detd. the limits of error of Meyer's method of titrating enolic compds.; the error can be reduced to 0.1–0.02% by the following process: Acetoacetic ester (1–1.5 g.) is quickly dissolved in alc. (30 cc.) at —7°, 0.2 or 0.1 *N* freshly prepared alc. Br soln. added until the liquid is yellow or brown and 10% β-naphthol soln. in alc. (2 cc.) then run in; the whole should be done in not more than 15 secs.; KI is now added and the liquid titrated with 0.1 *N* $Na_2S_2O_3$ soln. The correct value for the % of enol in equil. mixt. of acetoacetic ester is 7.4. The method is also applicable to solns. of the ester and to some other tautomeric compds. Acetyldibenzoylmethane must be titrated at 10°, which increases the error. Diacetylacetone reacts slowly with Br, dimethylcyclohexanedione and succinylosuccinic ester rearrange so rapidly at —7° that good results cannot be obtained. The above method is, however, applicable to acetylacetone and to benzoylacetic, oxalacetic and acetonedicarboxylic esters. At present no explanation can be given of the difference between the authors' results and those of Knorr in the case of acetoacetic ester. Piccard's paper (*C. A.*, **5**, 3444) is discussed and it is pointed out that although the diln. law applies to infinitly dil. solns., there is no means of knowing when a soln. becomes "infinitly" dil., *i. e.*, when the equil. becomes independent of the conc. Acetoacetic ester, in freezing C_6H_6, has mol. wt. 127.7–33.7. The following numbers express the % of acetoacetic ester in the solvents mentioned, the numbers in italics give the % of the ester existing in the enolic form. Only a few of the detns. are reproduced in this abstr. In abs. alc.: 65, *7.8*; 19, *10.8*; 1.0, *13.2*. In C_6H_6: 80, *8.3*; 42, *11.7*; 2.1, *20.6*. In CS_2: 82, *8.0*; 61, *11.7*; 35, *17.5*; 21, *22.8*; 11, *29.0*; 0.9, *39.2*. In hexane: 90, *9.3*; 83, *9.4*; 69, *12.2*; 32, *23.2*; 21, *31.5*; 12, *38.1* (av. of 3 detns.); 1.7, *58.6*. These results show that the equil. is dependent on the conc. It is suggested that possibly the solvent itself is not to be regarded as being of const. comp., but that the ester which reacts with the Br is to be looked on as existing in a solvent consisting of a variable mixt. of ester + alc., C_6H_6, etc. It is known that the equil. is dependent on the solubility of the 2 components. Consequently it may be that addition

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of ester to the alc., or other solvent, increases the solubility of the ketonic form and so increases its proportion present in equil. [This statement is not clear. The results given above show that the proportion of enolic form increases with the diln. Knorr's results apparently demonstrate that the ketonic form is the less readily sol. ABSTRACTOR.] Cf. following abstrs. J. BISHOP TINGLE.

Ketonic-Enolic Tautomerism. IV. Ferric Chloride Reaction of Enols. KURT H. MEYER. Chem. Lab., Acad. Sci., Munich. *Ber.*, **44**, 2725–9; cf. preceding and following abstrs.—The color produced by $FeCl_3$ and aq. acetoacetic ester solns. is instantly discharged by a few drops of Br–H_2O, but it soon reappears and the discharge and reproduction may be repeated. Quant. expts., at 0°, after 1 hr. show that the $FeCl_3$ acts as an enolizing agent; the quantity of enolic form is dependent on that of the $FeCl_3$, but is not proportional to it. In alc. soln., the detn. of enolic ester by means of $FeCl_3$ is very much more difficult, because of the permanent yellow color of the $FeCl_3$ in alc. The error in this case may be as high as 10%. The formation of Fe-enolate proceeds only slowly; this is due to the slowness of the reactions ketonic ⟶ enolic form and not to the slowness of the reaction enolic + Fe ⟶ Fe-enolate, because the quantity of enolate formed at 0°, after 5 mins., is independent of the conc. of the $FeCl_3$. The production of Fe-enolate is a monomol. reaction, K 0.017. This value is very similar to that obtained previously for the rearrangement of the ester by means of 0.1 *N* HCl. Lapworth has shown that the enolization by means of halogens is also a monomol. reaction. In alc., $FeCl_3$ appears to act catalytically on the rearrangement; titration immediately after the addition of $FeCl_3$ gave 12% of enolic ester, but after a few mins. the proportion was 30%. As explained above, these 2 results are only approximations. J. BISHOP TINGLE.

Ketonic-Enolic Tautomerism. V. Desmotropism of Methyl Benzoylacetate. KURT H. MEYER. *Ber.*, **44**, 2729–32; cf. preceding abstrs.—The method of titration with Br and β-naphthol, described above, has been applied to Me and Et benzoylacetates; at the ordinary temp. the former contains 16.7 and the latter 29.2% of enolic isomer. *Enolic methyl benzoylacetate* (*methyl β-hydroxycinnamate*) is isolated by dissolving the ester in well-cooled, aq. NaOH and adding well-cooled, dil. H_2SO_4; crystals, m. 30–40°. It gives an intense, reddish violet color with $FeCl_3$, reacts quickly with anti-*p*-nitrophenyldiazonium hydroxide and, at the ordinary temp., reverts spontaneously to the equil. mixt. after 2 days. At 20°, after 2 days, solns. of the ester contained the following % of enolic form, in the solvents mentioned: Glacial AcOH, 14; alc., 21; CS_2, 56; hexane, 69. In abs. alc., at 0°, the following % (in italics) of enolic form was found after the number of mins. mentioned: 0, *16.7*; 3, *19.8*; 6, *22.8*; 13, *24.9*; 20, *26.3*; 30, *26.3.*; this gives the value K_1 for the ketonization, 0.10 and K_2 for the enolization, 0.04. At the temp. of b. alc., the % of enolic isomer is 13.6. The following % of enolic form were found to be in equil. at the temps. mentioned: 18°, 16.7; 100°, 15.2; 200°, 13.95. Acetylacetone also contains more ketone in equil. at higher than at lower temps., whereas the equil. of acetoacetic ester is independent of the temp. This lack of a temp. coeff. must, therefore, be a sp. property of the acetoacetic ester and is independent of its nature as a ketonic-enolic desmotropic compd. (Cf. following abstr.) J. BISHOP TINGLE.

Tautomerism. V. Enolic Forms of Methyl Benzoylacetate and of Acetylacetone. LUDWIG KNORR. I Chem. Inst., Univ. Jena. *Ber.*, **44**, 2767–72; cf. preceding abstr. —Me β-hydroxycinnamate (enolic Me benzoylacetate) was isolated by Knorr, Rothe and Averbeck's method (*C. A.*, 5, 2836); m. about 40°; $n_D^{12.5}$ 1.5620. The original material (equil. mixt.) had $n_D^{12.5}$ 1.5418. The enolic compd. was also prepared from the Na salt, but the product was less pure; $n_D^{12.5}$ 1.5462. In contact with the glass prism of the refractometer the first specimen reverted to the equil. mixt. at the end of

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360 and the second specimen at the end of 180 secs. *Sodium salt*, $C_{10}H_9O_3Na$, at 0°, from MeONa, in Et_2O; plates. *Ethyl β-sodoxycinnamate*, $C_{11}H_{11}O_3Na$, from the Et ester. *Ferric salt*, $Fe(C_{10}H_9O_3)_3$, from the Na Me-ester salt and sublimed $FeCl_3$, in Et_2O; slender red needles from C_6H_6 + petroleum ether, m. 188°, previously softening. In Et_2O, sublimed $FeCl_3$ and the Me ester form a *chloro salt*, $FeC_{10}H_9O_3.Cl_2.3H_2O(?)$; opaque, yellow crystals. It is very hygroscopic and when warmed becomes greenish black. *Enolic acetylacetone*, $C_5H_8O_2$, was prepared by cooling solns. of the equil. mixt. in alc., Et_2O, or petroleum ether; m. —9°; n_D^{15} 1.4609. At 15°, after about 20 mins., in the refractometer, it was found to have reverted completely to the equil. mixt., n_D^{15} 1.4550. Attempts were made to isolate the ketonic isomer by shaking the equil. mixt. with $Cu(OH)_2$. The product was not purified completely (cf. following abstr.).

J. Bishop Tingle.

Tautomerism. VI. Colorimetric Method for the Quantitative Determination of Enols in Allotropic Mixtures. Ludwig Knorr and H. Schubert. I Chem. Inst., Univ. Jena. *Ber.*, **44**, 2772–8; cf. preceding abstrs.—The detns., the results of which are recorded below, were made by adding equal quantities (1 mol.) of sublimed, dry $FeCl_3$ to a soln. of pure enol of known conc., and to a soln. of equal conc., of the equil. mixt. under investigation. The colors were compared in an improved Duboscq app. and also in one of new design. The results have an accuracy of about 1%. The most intense color is developed by mixing the enol and $FeCl_3$, in equimol. proportions. Identical colors are obtained from the ferric enolic salts (1 mol.), $FeCl_3$ (2 mols.) and HCl (3 mols.). The most highly colored compds. are, therefore, $FeCl_2R$ (R = enol). The following *ferric salts* have been prepared: *Ethyl acetoacetate*, $Fe(C_6H_9O_3)_3$, from the Na salt, in abs. alc. and $FeCl_3$, in abs. Et_2O; opaque, red crystals, m. 99–100°. In soln. its color is orange. *Ethyl formylphenylacetate*, $Fe(C_{11}H_{11}O_3)_3$, is prepared like the preceding compd., but the solid residue obtained after evapn. in a vacuum is extracted with a mixt. of C_6H_6 + Et_2O; crystals from C_6H_6 + Et_2O + ligroin. In alc. the color is wine-red. At 98°, Me mesityloxideoxalate (enolic) is transformed into the equil. mixt. (4% enol) after 25 hrs. The ketonic form attains equil. after 200 hrs. At 78°, in abs. alc., the times were 12 and 24 hrs. for the enolic and ketonic forms, resp., the % of enol found being 3.7 and 3.8, resp. At the ordinary temp., in abs. alc., the enolic form attained equil. (4%) at the end of 8 weeks. The following numbers express the % of enolic ester found after heating pure enolic Me mesityloxideoxalate at 80°, during 14 days, in the solvent mentioned. The numbers in italics have the same significance, except that in their case the pure ketonic ester was heated: Abs. alc., 2.9, *3.0*; C_6H_6, 3.3, *3.5*; Et_2O, 4.2, *4.5*; $CHCl_3$, 3.1, *3.3*; CS_2, 4.0, *4.2*; acetone, 3.2, *4.2*.

J. Bishop Tingle.

Isomerism and Polymorphism. Hans Stobbe. *Ber.*, **44**, 2732–5.—Bülmann (*C. A.*, **5**, 2249) has misunderstood the author's previous paper (*C. A.*, **4**, 2632). If 2 compds. (A) and (B) have the same empirical comp., but differ in their cryst. condition, their differences must be due either to the arrangement of the ats. into dissimilar mols., or to the varied grouping of identical mols. into dissimilar crystals. In the former case (A) and (B) are isomeric chem. compds., but in the latter they consist of 2 modifications of a single, polymorphic, chem. individual. Isomerism and polymorphism are, therefore, fundamentally different in their nature. The definit experimental differentiation between them is, however, often a matter of great difficulty. If, for example, it has been shown, by the best means available, that (A) and (B), in soln. and when molten, are identical under all conditions and independently of the time; then they may be regarded as polymorphic modifications, or as chem. isomers which rearrange practically instantaneously. As methods of investigation

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improve the tendency is to isolate the individual isomers and so remove compds. from the class of polymorphic or from that of tautomeric substances. J. B. T.

Refractive Power for Light of Allo- and Isocinnamic Acids. HANS STOBBE. *Ber.*, 44, 2735–9.—The refractive power for the C line has been detd. at about 50° of allocinnamic acid (m. p. 68°), and of the isocinnamic acids (m. ps. 42° and 58°). A portion of the allo-acid was prepared from phenylpropiolic acid and H, in presence of colloidal Pd; another specimen was derived from an aniline salt supplied by C. Liebermann. The refraction of the molten acids was identical and there was no evidence to show that, when molten, the 3 did not consist of the same chem. individual (cf. following abstr.). J. BISHOP TINGLE.

Transformation of the Allo- and Isocinnamic Acids when Molten and in the Crystallin Form. HANS STOBBE. *Ber.*, 44, 2739–54; cf. preceding abstr.—In this abstr., for the sake of brevity, the allo-acid, prepared from phenylpropiolic acid, or from an aniline salt, is referred to as the 68° acid; Liebermann's iso-acid as the 58° acid and the iso-acid (Erlenmeyer sen.) as the 42° acid. Of this latter, 2 specimens were used. Each of the molten acids could be converted into any of the varieties by inoculation. Therefore all 3 acids are identical when molten. Specimens of each acid were sealed and protected from light; after 4 months they were unchanged in appearance and m. p. When a clear crystal of the 42° acid was placed in contact with a similar 1 of the 68° acid, at about 20°, the former became dull at the point of contact and after 5 mins. the whole was converted into 68° acid. The same transformation occurs more quickly at 30°. A similar result was obtained with crystals of the 42° and 58°, and with the 58° and 68° acids, the products being the 58° and 68° acids, resp. The expts. were repeated 5 times with the same result and they were confirmed by observations under the polarization microscope. Heat is evolved by the transformation of the 42° into the 68° acid, apparently 15–20° for 1 g. of acid. Under "aseptic" precautions, in darkness, at the ordinary temp., the acids were unchanged after 1.5 years. The 42° acid did not change after 80 hrs. at 37°, but at —80° after 5 mins., or practically instantaneously at —180°, it was transformed into the 68° acid. The 58° acid underwent the same change after 3 hrs. at —80° and after 10 mins. at —180°, but it was not affected after 30 hrs., at 52°. The 68° acid had suffered no alteration after 8 hrs. at —180°. These results indicate that the 3 compds. are trimorphic forms of the single, chem. individual ciscinnamic acid, $\begin{matrix}\text{PhCH}\\ \|\\ \text{HO}_2\text{CCH}\end{matrix}$. The fact that the velocity of the transformation of the labil acids increases enormously as the temps. fall is directly contrary to what is known of the velocity-temp. relation of chem. processes. Consequently, the 3 acids can hardly be regarded as chem. isomers. The results of many expts. made to det. the conditions under which the 42° and 58° acids could be transformed by m. and cooling, without inoculation may be thus summarized: The 42° and 58° acids, when m., give liquids which are optically identical. The cooling of this molten material to 20–0° produces the (solid) 42° acid; to —14°, the 42°, or 58° acid (solid); to —80° to —180° a vitreous mass, which, when the temp. rizes, passes into the 58° acid. Similar expts. with the 68° acid, without inoculation, gave a molten material identical optically with that from the 42° and 58° acids. When cooled to 24-0°, in quantity of 50 mg. or upwards, it gave usually the 68° acid, but occasionally the 42° isomer. In smaller quantity, below 50 mg., the product was usually the 42° acid, but sometimes the 68° compd. Cooling to —14° gave the 42°, or 58° acid, less frequently the 68° acid. Cooling to —80 to —180° gave a vitreous substance, which, as the temp. rose, passed into the 58°, but occasionally into the 68° acid. These results show that the optical identity of the molten material can only be apparent and

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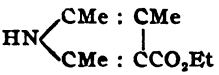
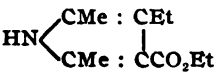
not real. The molten substance from the 3 acids is *not* identical under every condition and at all times. Under the conditions employed, the differences in the optical properties of the acids are too small for measurement, or the velocity of transformation is too great for detection. The final conclusion is that allocinnamic acid (68°) is monomorphous. The isocinnamic acid is chemically isomeric with it and exists in the dimorphic 58° and 42° forms. J. BISHOP TINGLE.

Morphine. XII. Codeine Methyl Ether and its Behavior towards Exhaustive Methylation. LUDWIG KNORR AND PAUL ROTH. I Chem. Inst., Univ. Jena. *Ber.*, 44, 2754-8.—*Codeine methyl ether*, $C_{19}H_{23}O_2N$, is prepared by heating at 100–10°, during 2 days, a mixt. of α-chlorocodide (100 parts) and abs. MeOH (500 parts), containing Na (15 parts); it is best isolated by adding HCl, in alc.; cryst., m. 137°; in alc., $[\alpha]_D^{15}$ —80°. *Hydrochloride*, $C_{19}H_{23}O_2N.HCl.0.5EtOH$, crystals from alc., decomp. about 285°, previously softening; in H_2O, $[\alpha]_D^{20}$ —66°. *Hydriodide*, concentric needles from H_2O, m. about 238–40° (decomp.). *Sulfate*, crystallizes readily, m. 241°. *Nitrate*, crystals, decomp. 219°. *Methiodide*, $C_{19}H_{23}O_2N.MeI$, opaque prisms from alc., m. 270° (decomp.). B., aq. NaOH converts it into *methylmorphimethine methyl ether*, which was isolated as the *hydriodide*, $C_{20}H_{25}O_2N.HI$; plates from alc., softens 200°, m. about 204–8°; $[\alpha]_D^{15}$ —85.5° (? in alc.). It does not undergo rearrangement by b. during 2 hrs. with alc. KOH. *Methiodide*, $C_{20}H_{25}O_2N.MeI$, feathery crystals from alc., m. 275°. When treated with Ag_2O and the product heated at 150°, it decomp. completely into methylmorphenol, C_2H_4, NMe_3 and MeOH. J. BISHOP TINGLE.

Synthesis of 2,4-Dimethyl-3-ethylpyrrole, a Contribution towards the Solution of the Question of the Constitution of Hemopyrrole. LUDWIG KNORR AND KURT HESS. I Chem. Inst., Univ. Jena. *Ber.*, 44, 2758–67.—*Ethyl 2,3,5-trimethylpyrrole-4-carboxylate*, formula (I) below, is prepared from isonitrosoethyl methyl ketone, Et acetoacetate, Zn dust and glacial AcOH; crystals from MeOH, m. 104–5°. Yield, about 30%. *2,3,5-Trimethylpyrrole-4-carboxylic acid*, from (I) and aq.-alc. NaOH (10%);

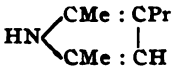


(I)



(II)

decomp. 198°. When distilled it is converted quant. into *2,3,5-trimethylpyrrole*; liquid, b_{754} 180–1°. It reacts with $HgCl_2$ and with a pine splinter. *Ethyl 2,5-dimethyl-3-ethylpyrrole-4-carboxylate* (II), is prepared in a similar manner to (I) from isonitrosopropyl methyl ketone, needles from MeOH, m. 106–7°. *2,5-Dimethyl-3-ethylpyrrole-4-carboxylic acid* from (II); decomp. about 200°. When distilled it gives *2,5-dimethyl-3-ethylpyrrole*; liquid, b_{750} 187–8°; b_{21} 93–4°. It has an odor of $CHCl_3$ and resembles the tri-Me compd. in its reactions. *Isonitrosobutyl methyl ketone*, crystals from alc., m. 60°. With Et acetoacetate, in the manner described above, it forms *ethyl 2,5-dimethyl-3-propylpyrrole-4-carboxylate*; prismatic crystals from MeOH, m. 110°. *2,5-Dimethyl-3-propylpyrrole-4-carboxylic acid*, from the ester; m. about 210° (decomp.). When distilled it gives *2,5-dimethyl-3-propylpyrrole* (III); colorless oil, decomp. in air,



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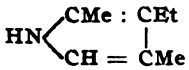

(IV)

b_{760} 206–7°. Its reactions are similar to those of the homologs described above. *2,4-Dimethyl-3-acetylpyrrolehydrazone*, $C_8H_{13}N_3$, from 2,4-dimethyl-3-acetylpyrrole and $N_2H_4.H_2O$; yellow, rhombic crystals from alc., m. 178–9°. At 150–60°, in an atm. of N, it is converted by EtONa and abs. alc. into *2,4-dimethyl-3-ethylpyrrole* (IV);

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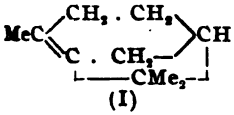
colorless oil, b_{37} 118°; b_{27} 107°; b_{16} 96°. It is very unstable in air, could not be solidified and lacks the flourescence characteristic of hemopyrrole. *Picrate*, concentric tablets from alc., m. 131–2°. With HNO_2 (IV) gives methylethylmaleicimideoxime, $C_7H_{10}O_2N_2$, m. 101°. These results show that neither 2,5- nor 2,4-dimethyl-3-ethylpyrrole is identical with hemipyrrole. Phonopyrrole may be identical with 1 of the isomers. Hemopyrrole is doubtless 2,3-dimethyl-4-ethylpyrrole and not (IV), as Piloty states (*C. A.*, **5**, 1261). J. BISHOP TINGLE.

Catalytic Reduction in a Vacuum. N. ZELINSKII. Lab. Org. and Anal. Chem., Univ. Moscow. *Ber.*, **44**, 2779–80.—H was passed through 1,3-dimethyl-3-cyclohexene-5-one at 150° and the resulting mixt. of gas and vapor was led over Ni, at 200°; the pressure in the whole app. was 75–80 mm. The product was fractionated (10 mm.); it contained 1,3-dimethyl-5-cyclohexaneone and 1,3-dimethyl-5-cyclohexaneol. Isophorone at 140°, over Ni at 180° (70–5 mm.), gave chiefly dihydroisophorone and some dihydroisophorol (cf. following abstr.). J. BISHOP TINGLE.

Catalytic Conversion of 1-Methyl-3-cyclopentaneone into Methylcyclopentane. N. ZELINSKII. Lab. Org. and Anal. Chem., Univ. Moscow. *Ber.*, **44**, 2781–2; cf. preceding and following abstrs.—When passed over Ni, at 150–60°, 1-methyl-3-cyclopentaneone is converted into a mixt. of H_2O, alc. and methylpentamethylene, together with some of the unchanged ketone. At 250°, the chief product is methylenepentamethylene, which is best prepared by this method. It appears that all the ketones of the cyclopentane series behave in a similar manner. [NOTE.—Instead of "alc." being formed, as stated above, the author probably means that 1-methyl-3-cyclopentaneol is produced.] J. BISHOP TINGLE.

Catalytic Isomerization of α-Pinene. N. ZELINSKII. Lab. Inorg. Chem., Univ. Moscow. *Ber.*, **44**, 2782–4.—The α-pinene employed was obtained from French turpentin oil and and the following consts.: b_{760} 155–5.5°; d_4^{20} 0.8587; n_{20} 1.4652; $[\alpha]_D$ −43.81°. The Pd black was prepared by the interaction of HCO_2H, KOH and $PdCl_2$; it was covered with abs. Et_2O, satd. with H and the pinene added. The mixt. was retained at the ordinary temp., during several hrs., more H being added occasionally. The resulting *isopinene*, formula (I) below, is probably produced from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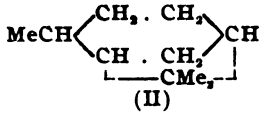
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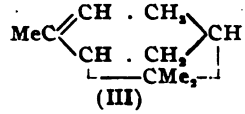
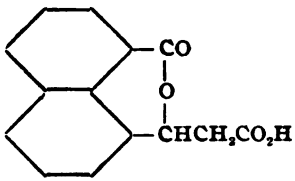

(III)

the hypothetical, intermediate hydropinene (II) which is supposed to be formed directly from α-pinene (III) and H. Liquid, b. 158.5–9.5°; d_4^{20} 0.8573; n_{20} 1.4641; $[\alpha]_D$ −38.09°; mol. ref. 43.78. Dry HCl does not combine with (I) and it does not form a cryst. nitrosochloride. Under similar conditions, during 4 weeks, with the H under greatly reduced pressure, (III) is converted into hydropinene (pinane) $C_{10}H_{18}$ (b_{748} 167.5–8°). Reduction of (III) by Sabatier's method gave a mixt. of 2 hydrocarbons, $C_{10}H_{18}$; the one b_{750} 163.5-5°; d_4^{20} 0.8512; n_{20} 1.4580; $[\alpha]_D$ −9.58. The isomer, b. 168–8.5° (cor.); d_4^{20} 0.8542; n_{20} 1.4601; $[\alpha]_D$ −13.3°. J. B. TINGLE.

Perinaphthalidoacetic Acid. H. PAULY. *Ber.*, **44**, 2785–6; cf. F. Sachs and P. Brigl, *C. A.*, **5**, 3427.—*Perinaphthalidoacetic acid*



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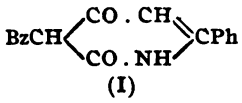
is best prepared by dissolving "naphthalidodimethyl ketone" (*Monatsh.*, **22**, 815 (1901)) (8 g.) in 5% aq. NaOH (55 cc.) and adding it to a mixt. of Br (20 g.), KOH (18 g.), H_2O (70 g.) and ice (70 g.). The $CHBr_3$ is removed and the residue treated with SO_2 and aq. HCl. Slender, tabular, stellate needles from alc. + H_2O, m. 158°; m. 168.5° (bath 140°). *Silver salt*, $C_{14}H_9O_4Ag$, small, microscopic plates.

J. Bishop Tingle.

Constitution of Antiarol. H. Thoms. Pharm. Inst., Univ. Berlin. *Ber.*, **44**, 2786.—C. Graebe and M. Suter (*Ann.*, **340**, 222 (1905)) have anticipated Thoms and W. Siebeling (*C. A.*, **5**, 3429) in showing that antiarol is 3,4,5-trimethoxyphenol.

J. B. T.

Action of Ammonia on Dehydrobenzoylacetic Acid. P. Petrenko-Kritchenko and I. Schöttle. Univ. Odessa. *Ber.*, **44**, 2826–30; cf. *C. A.*, **3**, 2438.—**Feist's** "α,α_1-diphenyl-γ-pyridone" (*Ber.*, **23**, 3736 (1890)) is probably *dehydrobenzoylacetic lactam*, formula (I) below, although it may possibly be (II), or (III). Prolonged b.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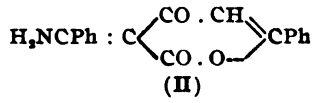
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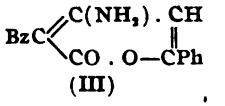
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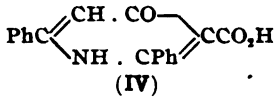
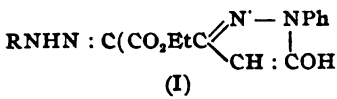
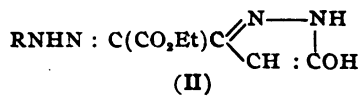

(IV)

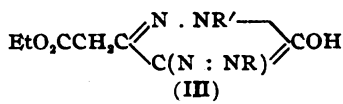
with conc., alc. KOH converts (I) into *diphenylpyridonecarboxylic acid* (IV); transparent crystals from aq. AcOH, m. 243–5° (decomp.). Yield, good. *Barium salt.* At 245°, (IV) is converted into CO_2 and α,α_1-diphenyl-γ-pyridone, which is also formed from (I) and conc. HCl, at 180°.

J. Bishop Tingle.

[Arylamineazo]-acetonedicarboxylic Ester and its Position-isomeric Condensation Products with Hydrazines. Carl Bülow and Herm. Göller. Chem. Lab., Univ. Tübingen. *Ber.*, **44**, 2835–47.—*Diethyl* [*anilineazo*]-*acetonedicarboxylate*, PhN:$NCH(CO_2Et)COCH_2CO_2Et$, is prepared from phenyldiazonium chloride, di-Et acetonedicarboxylate and AcOEt; large, yellow, transparent crystals from ligroin, m. 48.5°. Yield, 86%. *Diethyl* [*o-toluidineazo*]-*acetonedicarboxylate* and also the analogs described below, were prepared in a similar manner to the preceding compd.; short, opaque, canary-colored prisms from dil. alc., m. 80–5°, decomp. 195°. Yield, 94%. *Diethyl* [*p-toluidineazo*]*acetonedicarboxylate*, opaque, prismatic needles, lemon-yellow from alc., orange-colored from glacial AcOH, m. 81–1.5°. Yield, 90%. *Diethyl* [*m-xylidineazo*]-*acetonedicarboxylate*, crystals from dil. alc., m. 71–2°. *Diethyl* [*anthranilic acida zo*]-*acetonedicarboxylate*, bundles of pale yellow needles from alc., m. 145–6°. Yield, 70%. At the ordinary temp., glacial AcOH and PhN_2H_3 convert the above azo compds. into the pyrazole derivs., formula (I) below. *Ethyl 1-phenyl-3-*


(I)


(II)


(III)

[*glyoxylatephenylhydrazone*]-*5-hydroxypyrazole* (I; R = Ph), pale yellow needles from glacial AcOH, m. 137–8°. Yield, 81%. *Ethyl 1-phenyl-3*-[*glyoxylate o-tolylhydrazone*]-*5-hydroxypyrazole* (I; R = o-C_6H_4Me), pale yellow needles from alc., m. 171° (darkens).

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In conc. H_2SO_4 the color is dull brownish yellow, changing to greenish blue with a little solid "iron chloride." *Ethyl 1-phenyl-3-[glyoxylate p-tolylhydrazone]-5-hydroxypyrazole* (I; R = *p*-C_6H_4Me), bundles of lemon-yellow needles from alc., m. 170–1° (darkens). Yield, 98%. In conc. H_2SO_4 the color is brownish yellow; it is not changed by "iron chloride." *Ethyl 1-phenyl-3-[glyoxylate m-xylylhydrazone]-5-hydroxypyrazole* (I; R = *m*-$C_6H_3Me_2$), lemon-yellow, highly electric needles from alc., m. 151°. Yield, 87.5% of the azo ester. *Ethyl 1-phenyl-3-[glyoxylate phenylhydrazone-o-carboxylic acid]-5-hydroxypyrazole* (I; R = *o*-$C_6H_4CO_2H$), pale yellow needles from glacial AcOH, m. 218–9° (darkens and evolves gas). *3-[Ethyl glyoxylate phenylhydrazone]-5-hydroxypyrazole* (II; R = Ph), is prepared like (I) from $N_2H_4.H_2O$, as are also the analogs described below; pale yellow, opaque needles from alc., m. 170–1°. Yield, 80%. *3-[Ethyl glyoxylate o-tolylhydrazone]-5-hydroxypyrazole* (II; R = *o*-C_6H_4Me), bundles of lemon-yellow needles from alc., m. 162°. Yield, 73%. In conc. H_2SO_4 the color is brownish yellow, changing to greenish blue with "iron chloride." *3-[Ethyl glyoxylate p-tolylhydrazone]-5-hydroxypyrazole* (II; R = *p*-C_6H_4Me), opaque, deep yellow, lustrous crystals from alc., m. 180–1° (gas evolution). *3-[Ethyl glyoxylate m-xylylhydrazone]-5-hydroxypyrazole* (II; R = *m*-$C_6H_3Me_2$), greenish yellow, highly electric needles from alc., m. 207–8° (darkens and evolves gas). *3-[Ethyl glyoxylate phenylhydrazone-o-carboxylic acid]-5-hydroxypyrazole* (II; R = *o*-$C_6H_4CO_2H$), crystals from glacial AcOH, darkens 235°, decomp. and evolves gas 255°. Yield, 75%. In conc. H_2SO_4 the color is yellow. Et 3-acetate-4-[*p*-toluidineazo]-5-hydroxypyrazole is best prepared in AcOH soln. B. KOH soln. (10%) hydrolyzes it to *3-acetic acid 4-[p-toluidineazo]-5-hydroxypyrazole* (III; R = *p*-C_6H_4Me; R′ = H); brownish red plates from glacial AcOH, m. 130–5° (decomp.). At 140° it decomp. into CO_2 and 3-methyl-4-[*p*-toluidineazo]-5-pyrazolone (m. 195–6°). *Ethyl 1-phenyl-3-acetate 4-[p-toluidineazo]-5-hydroxypyrazole* (III; R = *p*-C_6H_4Me; R′ = Ph), from Et 1-phenyl-3-acetate-5-hydroxypyrazole and *p*-tolyldiazonium chloride; orange-colored, interlaced needles from glacial AcOH, m. 132–4°, decomp. about 200°. Yield, 89%. In conc. H_2SO_4 the color is orange-yellow, changing to bluish green with $K_2Cr_2O_7$. It is hydrolyzed by KOH to the acid, which Lapworth obtained from PhN_2H_3 and menthyl [*p*-toluidineazo]-acetoacetate. Ethyl 1-phenyl-3-acetate 4-[*p*-nitroanilineazo]-5-hydroxypyrazole (III; R = *p*-$C_6H_4NO_2$; R′ = Ph), is prepared like the preceding compd., from diazotized *p*-nitroaniline. Yield, 85%. J. Bishop Tingle.

Preparation of Cholesteryl Ethers. Otto Diels and Paul Blumberg. Chem. Inst., Univ. Berlin. *Ber.*, **44**, 2847–51.—An improved method is described for the prep. of cholesteryl chloride. The ethers mentioned below were prepared from the chloride, Mg and the resp. alcs. *Cholesteryl methyl ether*, $C_{27}H_{45}OMe$, is obtained from the chloride, Mg and MeOH, at 125°, during 12 hrs.; white crystals from acetone, m. 84°. Its color reactions are identical with those of cholesterol, except that they appear to be less intense. Yield, 50%. *Cholesteryl ethyl ester*, $C_{27}H_{45}OEt$, from alc., at 140°, during 18 hrs.; long, water-clear needles from acetone, m. 88–90°. *Cholesteryl propyl ether*, $C_{27}H_{45}OPr$, from dry PrOH, at 140–50°, during 6 hrs.; long, vitreous prisms from acetone, m. 99.5–100.5°. Cholesteryl benzyl ether, $C_{27}H_{45}OCH_2Ph$, from benzyl alc. at 150°, during 6 hrs., then at 170°, during 7 hrs., m. 114–5°, not 78°. Yield, 35% of the chloride. At 140°, during 8 hrs., α-cholesteryl chloride (from α-cholestanol), MeOH and Mg form a *hydrocarbon*, $C_{27}H_{46}$; plates or prisms from acetone at 30°, m. 56°. The Mg used above consisted of "ribbon" which had been slightly etched with dil. HCl and then dried. J. Bishop Tingle.

Acenaphthene. II. Frans Sachs and Gehr. Mosebach. Chem. Inst., Univ. Berlin. *Ber.*, **44**, 2852–62; cf. *C. A.*, **4**, 3231.—The yield of 5-nitroacenaphthene from acenaphthene, glacial AcOH and conc. HNO_3 is 84%. It is best reduced to the

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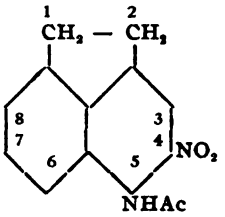
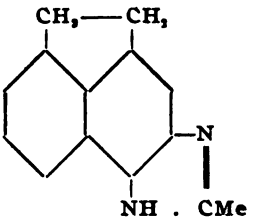
amino compd. by Na hyposulfite. Yield, about 77%. *5-Acenaphtheneazo-β-naphthol*, $C_{12}H_9N : NC_{10}H_6OH$, blackish red needles from glacial AcOH, m. about 186°. In conc. H_2SO_4 the color is dark blue, changing when warmed to blood-red. 5-Acetylaminoacenaphthene m. 192°, not 174°, or 185°. *4-Nitro-5-acetylaminoacenaphthene*, formula (I) below, from the preceding compd. and conc. HNO_3, in glacial AcOH, at

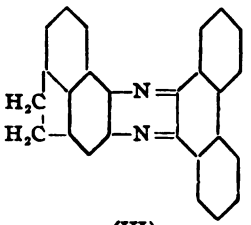


(I)



(II)

0°; golden yellow needles from glacial AcOH, m. 253°. In conc. H_2SO_4 the color is greenish brown. Yield, about 54%. With Na hyposulfite it gives *anhydroacetyl-4,5-diaminoacenaphthene* (II). *Hydrochloride*, $C_{14}H_{12}N_2.HCl$, crystals with a reddish luster. *Nitrate*, m. 320°. *Chloroplatinate*, yellow. Alc. HCl hydrolyzes (II) to *4-nitro-5-aminoacenaphthene*, $H_2NC_{12}H_8NO_2$, red prisms with a green luster from alc., or glacial AcOH, m. 222–4°. In alc. the fluorescence is green. Yield, 85%. *Hydrochloride*, unstable in air. *4,5-Diaminoacenaphthene*, $C_{12}H_8(NH_2)_2$; from the preceding compd., $SnCl_2$ and conc. HCl; opaque, unstable needles from MeOH, m. 140–2°. With phenanthrenequinone it gives a *compound* (III); yellow needles from toluene, m. 293°.



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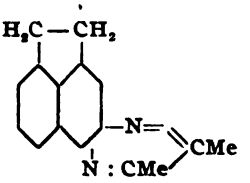
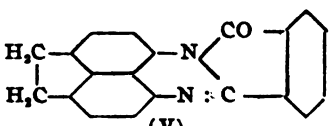


(IV)

Yield, 120% of the diamine. Diacetyl and 4,5-diaminoacenaphthene form the *compound* (IV); greenish yellow, stellate crystals from alc., m. 200°. *5-Hydroxy-4-nitroacenaphthene*, $HOC_{12}H_6NO_2$, from alc. NaOH and 4-nitro-5-acetylaminoacenaphthene; yellowish red needles from alc., or ligroin, m. 148°. *Sodium salt*, $C_{12}H_6O_2NNa.3H_2O$, large, dark red crystals from dil. alc.; after drying it contains $1H_2O$, *Barium salt*, amorphous, purple-red powder. *5-Hydroxy-4-aminoacenaphthene*, $H_2NC_{12}H_6OH$, from the nitro compd. and Na hyposulfite; highly unstable crystals, m. 159° (closed tube). Yield, 60%. *5,6-Diaminoacenaphthene* from the dinitro compd., $SnCl_2$ and HCl; light brown crystals from ligroin, m. 160°. Yield, about 50%. At about 200°, with phthalic anhydride it forms *phthaloaceperinone* (V); red needles from glacial AcOH,



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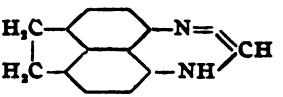

(VI)

m. 290°. In conc. H_2SO_4 the color is intensely bluish red. When the diamine and phthalic anhydride are heated with toluene the product is *aceperimino-o-benzoic acid*;

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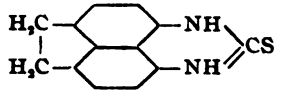
brownish yellow plates. At 80° it decomp. into H_2O and (V). *Aceperimidine* (VI) from the diamine, abs. alc. and pure HCO_2H; greenish brown scales with a metallic luster, m. 285°. Yield, 90%. *Cyclo-5,6-acenaphthylenethiocarbamide* (VII), from



(VII)

the amine and CS_2; colorless crystals from glacial AcOH, or $PhNO_2$, not m. 340°.

J. Bishop Tingle.

Formation of Esters (Goldschmidt). 2. Aqueous Solutions of Trimethylcarbinol (Doroshevskii). 2. Action of Formalin on Naphtha Distillates (Nastynkov, Malyarov). 22. Humulene of Hop Flowers (Deussen). 17. Congo Blue and Congo White (Fay, *et al.*). 25. The Chlorophyll Group (Marchlewski, Robel). 11. Indigo Yellow (Wuth). 25. Behavior of Molds toward Organic Acids (Herzog, *et al.*). 11.

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11. BIOLOGICAL CHEMISTRY.

Wm. J. Gies.

A. GENERAL.

Frank P. Underhill.

Ash-free Gelatin. Ch. Dhéré. *J. phys. path. gén.*, 13, 157.—Gelatin cannot be freed from ash by dialysis. A limit of 0.04% is reached. Electrolysis in the app. devized completely removes salts. Such ash-free gelatin shows a sp. cond. of 5.2×10^{-6}; it shows a filamentous structure microscopically, is opalescent between ½ and 5%, opaque between 1½ and 2½%; in other concs. gels are transparent. Its solubility in water and alc. is less than that of com. gelatin. Rate of swelling, imbibition and amt. of water imbibed increases with temp. Gelatinization does not occur till a conc. of 0.65% is reached; 0.25–0.50% com. gelatin will gel. The addition of traces of salts to ash-free gelatin increases its coagulability. H. C. Bradley.

Osmosis from the Point of View of Physics and Biology. Pierre Girard. Sorbonne, Paris. *J. phys. path. gén.*, 13, 359.—A discussion of the osmotic pressures and differences of potential on different sides of limiting membranes. H. C. B.

Twenty-five Years of Osmotic Pressure in the Medical Sciences. H. J. Hamburger. *Science*, 34, 583–9. E. J. C.

The Coagulum from Gelatin-Gum Sols and its Analogy with Casein. F. W. Tiebackx. *Z. Chem. Ind. Kolloide*, 8, 238–9.—A coagulum of gelatin and gamboge, when dissolved in 0.03 *N* HCl or KOH, is pptd. from the acid soln., by 20% KCl soln., but not from the alk. Dil. salt solns. of the coagulum ppt. in acid but never in alk. solns. The coagulum resembles casein in these respects, and in the fact that it adsorbs H_2SO_4 more strongly than HCl, and the acid is expelled by salts, causing swelling. These facts lead to the conclusion, already suggested by others, that casein and many other proteins are adsorption compds. of 2 different proteins, similar to the gelatin-gamboge coagulum. H. Isham.

The Water in Plasma. H. W. Fischer. Breslau. *Z. chem. Ind. Kolloide*, 8, 291–302.—The freezing of colloidal solns. is analogous to drying. Van Bemmelen's expts. on the drying of colloids show that as the water is removed the colloid goes through a change which is irreversible down to a certain amt. of adsorbed water. Below that

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irreversible point the colloid may adsorb and give off water reversibly, though the adsorption and drying curves form an energy surface showing that the heat changes in the 2 processes are not equal. Since the formation of ice in plant and animal structures first occurs in the intracellular spaces, and is followed by a flowing of water from all sides toward the ice crystals, the phenomenon is practically the same as a drying process, in which the drying agent resides within the structure. The ice formation cannot be the cause of death, and it must be looked for in the removal of water, or the change of the plasma colloid. The formation of ice in the structure, at the f. p., is not necessarily followed by death, but death usually results at a lower, and as definitly fixed temp. called the "death point." The death point depends only on the condition of the plasma; plants closely related in their structure show widely varying death points. According to Matruchot and Molliard the death point is reached when the greater part of the cells passes the irreversible point. The adsorptive action of colloids on water increases on long standing in the cold, and the irreversible point is lowered. Similarly vegetables are found to have a lower death point if kept for some time at low temp. The potato, *Magnum bonum*, kept from 4 to 7 weeks at 22.5°, "died" at —2.14°, while if kept at 0° for 4–7 weeks the death point was —3.08°. The adsorptive capacity is also greater with new than old colloids; similarly young plants are more resistant to cold than old. From van Bemmelen's drying curves the following conclusions may be drawn with regard to freezing curves: Since part of the water in a gel is adsorbed the distribution of the heat over the temp. interval for freezing will be different from that of a true soln. of the same conc. Since there is an energy surface formed by the drying and swelling curves of a colloid, the amt. of heat required to change a colloid at 15° to —15° with freezing will be different from that required to raise the same from —15° to 15°. If we follow the freezing curve of an object which dies during the cooling, a second freezing curve of the same object after death will be different from the original one. Animal tissues show in general these same phenomena on cooling, though the death point is usually higher than with vegetable tissues. H. ISHAM.

Researches on Chlorophyll and Hematin. PAUL HIRSCH. Berlin. *Med. Klinik*, **7**, 1430–2.—A review. P. J. HANZLIK.

Recent Work on Nuclease. FLORENTIN MEDIGRECEANU. New York. *Med. Klinik*, **7**, 1209–10.—A review. P. J. H.

The Action of Oxidases. I. R. O. HERZOG AND A. POLOTZKY. Chem. Inst. techn. Hochsch., Karlsruhe. *Z. physiol. Chem.*, **73**, 347–57.—The course of the reaction between the peroxidase of white beet, H_2O_2, and an "oxidase reagent" depends on a variety of conditions. As oxidase reagents were employed the leuco-base of brilliant green, vanillin, and a mixt. of *p*-phenylenediamine and dimethylaniline. With peroxidase const., there is for each of the other participants in the reaction a definit optimum conc. With brilliant green the reaction consists in the gradual development of an intense green, followed by a slower bleaching. Both are oxidation processes. Complete bleaching occurs only when H_2O_2 and peroxidase are greatly in excess of leuco-base. Combinations of 2 of the 3 reacting substances were allowed to stand at room temp. for 14 hrs.; the 3rd was then added and the course of the reaction followed colorimetrically. (*a*) Peroxidase added last: The reaction velocity was greatest, the color appeared and disappeared most rapidly, and its intensity was maximal. (*b*) Leucobase added last: The reaction was slower and the max. color very much weaker; the peroxidase was damaged by the H_2O_2. (*c*) H_2O_2 added last: There is a pronounced "induction period," the max. of color is rather less intense than in (*a*), and it is attained less rapidly; a combination of leuco-base + peroxidase has taken place,

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and it is only after the H_2O_2 has expelled the former and combined with peroxidase to form a "true oxidase" that pigment formation occurs. A. HUNTER.

The Action of Oxidases. II. R. O. HERZOG AND A. MEIER. *Z. physiol. Chem.*, 73, 258–62; cf. preceding abstract.—To 150 cc. of 0.96% vanillin soln. were added H_2O_2 and oxidase from horse-radish, each in regularly varying proportions; the whole was made up to 400 cc., and after 12 hrs. the ppt. of dehydrodivanillin was weighed. When the conc. of H_2O_2 was very low, the amt. of ppt. was independent of the peroxidase. With each higher conc. of H_2O_2 the yield increases with increasing peroxidase till a max. is reached. Where the H_2O_2 conc. was high in relation to the peroxidase, the latter was destroyed; the filtrate does not react with guaiac and H_2O_2. In that the yield of ppt. depends on the amt. of each of the participants, the reaction differs from a typical catalysis. The peroxidase effect belongs rather to the so-called "induced reactions." A. HUNTER.

The Biologically Important *d*-α-Aminobutyric Acid, and *l*-α-Aminobutyrylglycine. Preliminary Communication. A. H. KOELKER. Physiol.-chem. Lab., Johns Hopkins Univ. *Z. physiol. Chem.*, 73, 312–3.—The asymmetric hydrolysis of *dl*-α-aminobutyrylglycine was accomplished by means of the peptolytic enzyme of yeast. The products were glycine, *d*,α-aminobutyric acid ($[\alpha]_D^{20}$ + 9.0°), and *l*,α-aminobutyrylglycine ($[\alpha]_D^{20}$ −86.5°); they were sepd. directly by fractional crystn. from H_2O and H_2O + EtOH. A. HUNTER.

Studies in the Chlorophyll Group. X. Phyllohemin. II. L. MARCHLEWSKI AND J. ROBEL. *Biochem. Z.*, 34, 275–9; *C. A.*, 5, 2860.—Further evidence that phylloporphyrin and blood porphyrin are constitutionally similar. G. M. MEYER.

Behavior of Phenolase towards Acids. A. BACH AND B. SBARSKY. Private Lab. and Univ. Geneva, Switz. *Biochem. Z.*, 34, 437–80.—Small amts. of acid stimulate the oxidation of pyrogallol by phenolase. With the increase of acid purpurogallin formation is retarded but the coloration of the mixt. is intensified. After purpurogallin formation has ceased further addition of acid inhibits the color production. With uniform phenolase conc. and variable substratum the lethal acid doses are proportional to the active phenolase. G. M. MEYER.

Interaction of Casein and Fat in Milk. A. KREIDL AND E. LENK. Proc. Soc. Morph. and Physiol., Vienna. *Zentr. Physiol.*, 25, 478–9.—Fat globules in the milk are not enclosed in a membrane (haptogen theory). Milk fat becomes insol. only after a fat solvent (ether) has been added to the milk. These fat solvents cause a sepn. of the casein emulsion with the formation of the haptogenic membrane. If $CHCl_3$ is used as solvent the casein emulsion sinks and the fat rizes. This permits the prep. of pure casein emulsions. After alkali has been added to the milk, the casein is present not as an emulsion but as a soln., and cannot form the membrane when ether is added. G. M. MEYER.

Electrical Effects Accompanying the Decomposition of Organic Compounds. M. C. POTTER. Univ. Durham. *Proc. Roy. Soc. London*, (*B*) 84, 260–76.—Two Pt wires were placed in a porous cup and in an outer jar, the cup and jar filled with glucose soln., and the wires connected with a condenser which could be discharged through a galvanometer. Yeast was then added to the soln. in the outer vessel. For a short time after the introduction of the yeast no e. m. f. was observed, but as the organism commenced its activity a gradually increasing voltage was registered, the current passing from the yeast-glucose to the glucose soln. The rise in voltage was detd. by the conc. of the glucose soln., the temp. and the amt. of yeast added. Thus, at 25° with 5 g. yeast in 100 cc., the max. of 0.32 v. was reached in 10% glucose in 7 min., then declined to 0.25 v. at the end of 40 min., when it remained fairly const.

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for another 50 min., while in 50% soln. it reached only 0.08 v. after 90 min. The greater the amt. of yeast, the greater the voltage and the steeper the gradient of the curve. From 10 to 25°, the voltage increases with the temp., but at temps. as low as 0° or as high as 50°, no e. m. f. is observed. The max. voltage never exceeded 0.3–0.4 v., independently of the vol. of the fermenting liquid or the size of the electrodes. "Invertase-cane sugar" and "diastase-starch" cells of the same type exhibited small e. m. f. Dil. H_2SO_4 acted like invertase. *Bacillus coli communis* developed an e. m. f. in a modified Pasteur soln. containing asparagine or starch. Similar phenomena are observed with Zn-H_2SO_4, P-H_2O and Na (or K)-H_2O cells. Arterial blood has a higher potential than venous blood, and a stream of O raises it further, while CO_2 lowers it, so that the direction of the current is reversed. With non-polarizable electrodes, the phenomena observed with yeast-glucose and Zn-H_2SO_4 cells are entirely analogous. Electrodes of other material than Pt (Au, Ni, Sn, Zn, C) all exhibited an e. m. f. in the yeast-glucose cell, the current always passing from the yeast-glucose to the glucose soln. All these expts. show that elec. energy is liberated in the disintegration of org. compds. by microörganisms. CHAS. A. ROUILLER.

Physical-chemical Investigations on Animal Liquids. VI. Chemical Reaction of Lymph. G. QUAGLIARIELLO. Ist. fisiol. sper. r. univ. Napoli. *Atti accad. Lincei*, **20**, II, 273–9; cf. *C. A.*, **5**, 3589.—The expts. were carried out on the serum of coagulated dog lymph obtained through a temporary fistula of the thoracic duct. The actual reaction was detd. by means of H electrodes, the serum being compared with 0.01 *N* HCl, KCl being used as the connecting liquid. In the titrimetric detns. (with phenolph. or methyl orange) the amt. of NaOH (acidity) and HCl (basicity) required to give the same tint as mixts. of phosphates and H_3PO_4 having H ion concs. of 1×10^{-9} and 2×10^{-4}, resp., was measured. Similar detns. were made on blood serum. The mean results for lymph and blood, resp., were as follows: Acidity (in g. equiv./l), 0.022, 0.021; alkalinity, 0.19, 0.23; alk./acidity, 8.8, 10.9; $C_H \times 10^7$, 0.151, 0.259; $C_{OH} \times 10^7$, 4.23, 2.53; D_a (= $[H^+]$/potential acidity), 0.00007, 0.00012; D_b (= $[OH]^-$ potential alkalinity), 0.00024, 0.00011; K_a (= $[H^+]^2$/potential acidity), 1.17×10^{-14}, 3.19×10^{-14}; K_b, 1.18×10^{-12}, 0.28×10^{-12}. The alkalinity of the lymph varies considerably according to conditions, being lowest when the animal has received nutriment rich in fats, owing to the passage of fat acids into the lymph. The introduction of an alk. soap soln. in the stomach also decreases the alkalinity of the lymph. In animals fasting 24 hrs., the lymph is more alk. than in those fed with lean meat or carbohydrates. CHAS. A. ROUILLER.

B. METHODS AND APPARATUS.

STANLEY R. BENEDICT.

Apparatus for Measuring Gas Exchanges of Small Animals. G. WEISS. *J. phys. path. gén.*, **13**, 337.—A description of respiratory app. for use with frogs. H. C. BRADLEY.

Methods for Examination of Urin. JAR. STARY. Prague. *Cas. Cesk. Lékárn.*, **39**, 603–5.—A routine for the detection of fibrin, hemoglobin and other blood pigments by well known tests is presented. P. J. HANZLIK.

A New Dosimeter for Röntgen Rays. G. HOLZKNECHT. Wien. *Wien. Med. Wochsch.*, **61**, 2185–8. P. J. H.

The Detection of Carbon Monoxide in Blood by the Use of Ammonium Sulfide and Hydrogen Peroxide. T. LOCHTE. Univ. Göttingen. *Therap. Monatsh.*, **25**, 608–9.—The addition of $(NH_4)_2S$ and 3% H_2O_2 to a very dil. soln. of blood (1 drop to 10 cc. H_2O) caused an olive color in normal blood, free from CO, while blood satd. with CO remained cherry-red. According to the CO content of the blood the color

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was preponderatingly green or red. The absorption spectrum of the green, CO-free blood showed a strong band in the red and a weak band in the green, corresponding to the spectrum of sulfurmethemoglobin. When CO was present, the CO-hemoglobin spectrum was superimposed on the S-hemoglobin spectrum. The lower limit for the detn. of CO was 20% CO. By the use of paraffinum liquidum, the solns. were kept unaltered for long periods. H. B. LEWIS.

Biologic Tests for Epinephrine. R. G. HOSKINS. Lab. Physiol., Harvard Med. School, Boston, Mass., and Starling, Ohio Med. Coll. *J. Exp. Pharm.*, 3, 93–9.—The eye, uterus and intestin tests were compared as to their efficiency. The authors recommend the last as being most reliable. The use of intestinal "segments" involves less manipulation than the "strips" and is therefore preferred. The reaction is sensitive to a diln. of adrenaline of 1 : 100,000,000. G. M. MEYER.

The Determination of Small Degrees of Enzymic Peptolysis. DOROTHY COURT. Heriot-Watt College. *Proc. Roy. Soc. Edinburgh*, 31, 342–8.—It was proved that the "intensity of the green color given by Mörner's reagent with tyrosine is in proportion to the amount of tyrosin present." The intensity of color was read by Westergaard's method of neutralization with one red glass plate of proper intensity of color. It was, further, found that the tyrosine, produced by pancreatin acting on peptone satd. with $CHCl_3$ can be sepd. from peptone by filtration, and estd. I. K. PHELPS.

Determination of Traces of Alcohol (KLÖCKER). 16. Determination of Phosphorus in Milk (SLONIEWSKI). 7.

C. BACTERIOLOGY.

ERNEST D. CLARK.

The Formation of β-Alanine by Bacterial Action. D. ACKERMANN. Physiol. Inst., Würzburg. *Z. Biol.*, 56, 87–90.—Aspartic acid is converted by putrefactive bacteria into β-alanine. The substance was identified as the chloroplatinate. A. F. BLOOD.

The Splitting of the Pyrrolidine Ring by Bacteria. D. ACKERMANN. Physiol. Inst. Würzburg. *Z. Biol.*, 57, 104–11.—Proline is reduced by putrefactive bacteria to δ-aminovalerianic acid. A. F. BLOOD.

Study of the Inulase of Aspergillus niger. J. BOSELLI. Inst. Pasteur. *Ann. inst. Pasteur*, 25, 695–704.—The secretion of inulase by *A. niger* is constant in action under like conditions on inuline, levulose, saccharose, glucose or saccharose and peptone. It diffuses into the culture fluid early during the growth, and the law of its action, supposing the initial conc. invariable, is logarithmic. The optimum acidity varies with the temp., the higher the temp. the lower the acidity. At the optimum temp., 51°, the optimum conc. of H_2SO_4 is 1/200 *N*, while that of AcOH is 1/12.5 *N*. Faint alkalinity arrests the action of the enzyme at all temps. At the same temp. and with optimum concs. of H_2SO_4 and AcOH, the activities of the ferment are identical. H. J. CORPER.

The Behavior of some Molds toward Organic Acids. I. R. O. HERZOG AND O. RIPKE. Chem. Inst., tech. Hochsch., Karlsruhe. *Z. physiol. Chem.*, 73, 284–9; cf. *C. A.*, 3, 1537; 4, 55.—*Mycoderma cerevisiae*, *Monilia candida*, and *Oidium lactis* were grown on Uschinsky's nutrient soln. with 0.5–3% of one of the following acids: HCO_2H, AcOH, $EtCO_2H$, $MeCH(OH)CO_2H$, succinic, malic, glycollic, citric and racemic. In 1.5 months 28–99% of the acid disappeared, the molds exhibiting a degree of sp. electivity. When a few g. of the mycelium of *Oidium lactis*, killed by acetone, are suspended in an aerated dil. soln. of $MeCH(OH)CO_2H$, the acid diminishes and CO_2 is evolved in much greater amt. than in the parallel expt. with H_2O. With $MeCH(OH)CO_2Na$ the results are not so striking; with succinic and mandelic acids they are negative.

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II. R. O. HERZOG, O. RIPKE AND O. SALADIN. *Ibid.*, 290–301.—*Mycoderma cerevisiae*, killed by acetone, is able to destroy acetic, lactic, mandelic and tartaric acids, optical antipodes being attacked with equal rapidity. The disappearance is not in this case due to oxidation, for the CO_2 production is less than in the parallel expt. with H_2O. *Mycoderma* that has been grown on wort is much more active than that from artificial media. The reaction is a chem. transformation, not merely a salt-formation. Succinic acid is not attacked. Identical results were obtained in expts. with the living mold.
A. HUNTER.

The Behavior of some Molds toward Amino Acids. R. O. HERZOG AND O. SALADIN. *Z. physiol. Chem.*, 73, 302–7.—The addition of leucine to a culture of *Penicillium glaucum* leads to an increased production of CO_2; the over-production is much greater than could be accounted for by the complete oxidation of the leucine that disappears. *Penicillium*, killed by acetone, also yields more CO_2 when suspended in a soln. of leucine, than in H_2O. A. H.

Alteration of the Fermentative Properties of Yeast Cells Produced by Killing with Acetone. R. O. HERZOG AND O. SALADIN. *Z. physiol. Chem.*, 73, 263–83.—When dextrose, levulose, and mannose are fermented with living yeast, the ratio of the respective reaction velocities is 1 : 0.63 : 0.52. When the yeast is killed its relative activity towards the 3 sugars is entirely altered; after treatment with acetone the ratio becomes 1 : 1.06 : 0.81. The following amts. of fresh yeast would induce the same rate of fermentation in the respective cases: With mannose 1 g.; levulose 0.82 g.; dextrose 0.52 g. For acetone yeast the corresponding amts. are 6, 4.6, and 4.8 g.
A. H.

Yeast Gum. E. SALKOVSKII. *Z. physiol. Chem.*, 73, 314–6.—Reply to Euler and Fodor; see *C. A.*, 5, 3297. A. HUNTER.

Metabolism of Molds. Investigations on Aspergillus fumigatus. I. C. RAVENNA AND G. PIGHINI. *Gazz. chim. ital.*, 41, II, 109–14; cf. *C. A.*, 5, 1633.
CHAS. A. ROUILLER.

D. BOTANY.

CARL L. ALSBERG.

The Comparative Viability of Seeds, Fungi and Bacteria when Subjected to Various Chemical Agents. RICHARD DE ZEEUW. Botanical Lab., Univ. of Mich. *Centr. Bakt. Parisitenk., II Abt.*, 31, 4–23.—The object of Z.'s work was to supply evidence to prove adequate or inadequate the ordinary methods generally employed for furnishing seeds free from contaminating organisms. For this purpose lots of 25 each of *Lupinus albus, Pisum sativum, Triticum vulgare, Hordeum vulgare, Zea mays and Sinapis alba* were treated for varying lengths of time with $K_2Cr_2O_7$-H_2SO_4 cleaning fluid, $HgCl_2$, H_2O_2, $K_2Cr_2O_7$, CH_2O gas on dry seeds and CH_2O gas on seeds soaked in water for 5 mins. The criterion was the length of time the seeds could be left in the disinfectant and still yield 70–80% good seedlings, and after detg. this the effect of the different disinfectants still permitting a fair % of seeds to germinate was studied on the fungi and bacteria. Of 48 lots tested only 2 lots of *Sinapis alba* and 3 lots of *Lupinus alba* were free from bacteria and fungi and the only disinfectant which removed all contaminating organisms were cleaning fluid and H_2O_2. Br water was also successful in the case of *Lupinus albus*. Control expts. proving the technic aseptic were carried out. Z. concludes that the majority of cases of so-called disinfection previously reported were merely cases of antisepsis and that for practical results in physiological experimentation we must look to antisepsis rather than to disinfection.
H. J. CORPER.

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Origin and Physiological Function of Pentosans in Plants. CIRO RAVENNA. *Gazz. chim. ital.*, 41, II, 115–29; cf. *C. A.*, 5, 229, 1465. CHAS. A. ROUILLER.

Significance of Mucilages in the Germination of Seeds. C. RAVENNA AND M. ZAMORANI. *Gazz. chim. ital.*, 41, II, 138–43; cf. *C. A.*, 5, 1632. C. A. R.

Botanical Microchemistry. GRÜSS. Friedrichshagen. *Chem. Ztg.*, 34, 1048–9. —A review. E. J. WITZEMANN.

The Formation of Carbohydrates in Green Leaves. KOHN. *Wiener Landw. Ztg.*, 61, 868–9.—A discussion of the expts. of Stoklasa and others. The office of the chlorophyl is to absorb the ultraviolet rays and thus serve as a sensitizer.

P. A. YODER.

E. NUTRITION.

P. B. HAWK.

NORMAL.

The Significance of Lipoids in Nutrition. WILHELM STEPP. Med. Klin. Giessen. *Z. Biol.*, 57, 135–71.—Mice die in about 2 weeks when given food completely extracted with alc. and ether. The defect is not remedied by the addition of salts or butter fat, but if the alc.-ether ext. from lipoid-rich material (egg yolk) is added to the extracted foods, the mice thrive. The necessary lipoids of milk are chiefly in the milk plasma. Boiled milk is less effective than raw milk when added to a lipoid-free diet. Com. lecithin and cholesterol are not adequate substitutes for food lipoids.

A. F. BLOOD.

Studies in Milk Secretion. J. B. LINDSEY. Mass. Agr. Expt. Sta., *Report* 23, (1910), Pt. 3, 86–121.—Exptg. with cows, it was found that a large excess of digestible protein increased the flow of milk; 50% excess of digestible protein produced 5.9% more than a ration containing 21% excess protein; 31.3% over the protein min. produced an apparent increase of 10% in milk yield; to avoid individuality influences, group exptn. with 20 or more animals was most suitable; an excess of 50% of digestible protein above the protein minimum is ample for all ordinary purposes; and varying amts. of protein appear to be without influence upon the comp. of the milk.

C. A. BRAUTLECHT.

Expenditure of Energy in Walking. J. AMAR. *J. phys. path. gén.*, 13, 212.—The consumption of O in excess of that during repose indicates the energy required in walking. Length of step, cadence, and speed affect the consumption of O. The most economical expenditure occurs at a speed of about 4.5 km. per hr., the cadence varying from 76 to 157 per min. H. C. BRADLEY.

Physiology of Milk Secretion and the Nutrition of Infants during the Early Days of Life. E. OPITZ. Düsseldorf. *Med. Klinik*, 7, 1483–7.—A lecture and review.

P. J. H.

The Behavior of the Acetone Substances in Intermediary Metabolism. H. CHR. GEELMUYDEN. Physiol. Inst., Univ. Christiania. *Z. physiol. Chem.*, 73, 176–91.—Nine expts. are reported on phlorhizinized rabbits fed with cabbage. Five received subcutaneous injections of 1.98–4.48 g. $MeCOCH_2CO_2H$, 4 of 2.13–4.48 g. $MeCH(OH)CH_2CO_2H$. The curve of sugar excretion was generally irregular, but the rise accompanying each injection was unmistakable. The summit was reached sometimes on the same day, sometimes on the day after. The results lend support to the view that the acetone substances are synthetized to carbohydrate, possibly to glycogen.

A. HUNTER.

The Composition of Dogs and Cats during the First Period Required for the Doubling of Weight after Birth. K. THOMAS. Physiol. Inst., Univ. Berlin. *Arch. Physiol.*, 1911, 9–38.—Analyses were made of the bodies of cats and dogs of the same litters

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maintained under the same conditions of diet and killed at varying ages. The fat content of new-born animals was very slight and increased 2 1/2 times as rapidly as the N content in the first period of growth. Those animals which at birth are fitted to maintain their own body temp. (man, guinea pig) were rich in fat at birth. The ash content of the bones increased with age, in proportion to the N content. The fat- and bone-free tissue was richer in H_2O in youth. Probably the total ash content in youth was somewhat greater. The skin grew at first more rapidly than the surface, and increased in thickness. The surface const. increased with age in cats and dogs, and diminished in guinea pigs. H. B. LEWIS.

Ferment Action in the Digestion of the Ruminants. J. MARKOFF. Thier. Physiol. Inst. Kgl. Landwirt. Hochschule, Berlin. *Biochem. Z.*, 34, 211–32.—Gases from the paunch were collected directly from a goat fed on a variety of foods. The gases consisted chiefly of CO_2 and CH_4. Usually CO_2 is in excess although by solely feeding hay and in starvation CH_4 is predominant. After oats CO_2 is present in relatively large amts. Addition of sugar or protein has no influence on the ratio of CO_2 to CH_4. H is present in nearly all samples but never beyond 10% of the CH_4 value. H was highest after feeding a mixt. of hay, beets and oats, (CO_2 = 54.32, CH_4 = 36.15, H = 3.1%). Gases collected from the rectum of an ox were also analyzed. In these gases CH_4 was far in excess of CO_2 (CH_4 = 59.9, CO_2 = 22.49%). This is probably due to the rapid absorption of CO_2 by the blood. Fermentation expts. *in vitro* were carried out with the contents of the paunch. The addition of dextrose, sucrose or raffinose increases the fermentation process. In these expts. CH_4 was often found under the H value, particularly when dextrose or sucrose had been added. This would seem to explain the increase in H in the intestinal gases after ingestion of beets. G. M. MEYER.

The Nutritive Requirement of Old Men. E. KOCH. Physiol. Inst., Univ. Helsingfors. *Skand. Arch. Physiol.*, 25, 315–30.—Analyses of the food, urin and feces of 5 old men for a week showed that the metabolism of normal old men was more restricted than that of younger individuals. The av. daily intake was 106 g. protein, 55 g. fat, 361 g. carbohydrate and 34 g. ash, a total of 2430 cals. Of this, material corresponding to 195 cal. was found in the feces, giving an av. utilization of 2235 cal. or 33.8 cal. per k. body wt. H. B. L.

ABNORMAL.

The Effect of Loss of Blood on Digestion. N. A. DOBROVOLSKII. Cab. path. l'Inst. Imp. *Arch. sci. biol.*, 16, 205–53.—The effect of loss of blood on digestive processes in dogs was studied by the fistula method. The removal of 1/4 of the blood greatly retards gastric digestion. Secretion is diminished and evacuation is independently retarded. The injection of salt does not alleviate the abnormal condition. The secretion of bile is much diminished for several days. A. F. BLOOD.

Nitrogeneous Equilibrium. HENRI LABBE. Paris. *J. phys. path. gén.*, 13, 197.—L. conducted a balance expt. upon himself, reducing the protein intake from 65 to 35 g. per day, securing perfect equil. in 5 days without loss of wt. Tables of intake and outgo indicate a const. NH_3 level, suggesting the endogenous production of that compd. Creatinine appears to have an exogenous origin (the method of Kolisch employed). H. C. BRADLEY.

Fat Content of Feces. P. ROCHAIX. Lyon. *J. phys. path. gén.*, 13, 414.—The total ether-sol. material, the % of fatty acid and of neutral fat were detd. under various conditions of diet and abnormality to det. if possible the diagnostic significance. Large variations in the fat content and in its comp. are apparently normal. Lack of bile and pancreatic juice gives rise to an increased elimination of fat, which is largely neutral, showing lack of lipase. Elimination of pancreatic juice alone increases slightly the

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fat elimination without a marked increase of neutral fat. Elimination of the bile from the intestinal tract markedly increases the fat excreted. H. C. B.

Metabolism in Anemic Conditions. HEINRICH HAASE. *Wien. Med. Wochschr.*, 61, 1867–70.—In rachitis and anemias, the importance of Fe, Ca and NaCl for the organism is recognized. Cow's milk is ordinarily too poor in NaCl and this leads to increased secretion of HCl by the stomach. The addition of 1.6 g. NaCl to 1 l. cow's milk is advisable to make up this deficiency. P. J. HANZLIK.

The Effect of Alanine on the Elimination of the Acetone Substances. G. FORSSNER. Stockholm. *Skand. Arch. Physiol.*, 25, 338–42; cf. *C. A.*, 5, 2286–7.—In man, on a carbohydrate-free diet, after hard muscular exercize, there resulted an acetonuria extending through more than 12 hrs. After the addition of 30 g. alanine to the diet the acetone elimination decreased from 1.269 to 0.878 g. The elimination of β-hydroxybutyric acid was decreased from 4.64 to 1.48 parts per 1000. H. B. LEWIS.

F. PHYSIOLOGY.

ANDREW HUNTER.

Muscle Reaction Time and Temperature. G. FILON. Paris. *J. phys. path. gén.*, 13, 19.—The reaction time of various frog muscles is found to approximate van't Hoff's law. H. C. BRADLEY.

Potential Sugar of the Blood. R. LEPINE AND BOULUD. *J. phys. path. gén.*, 13, 178.—The increased reduction of blood following hydrolysis of the clot by acids (HF) is due to the "potential" sugar. Bleeding an animal results in an increase of potential sugar; in some cases an increase of the total. Light asphyxia and hyperthermic treatment, increase the potential sugar content. Following certain acute infections the total sugar may be greatly increased with a relative decrease of the potential; under other conditions that produce hyperglucemia the potential sugar may increase. Venous blood contains more potential sugar that arterial. Invertase liberates a small portion of potential sugar. H. C. BRADLEY.

Action of Secretin. S. LALOU. *J. phys. path. gén.*, 13, 343.—A standardized secretin soln. mixed with pancreas brei, incubated at 40° for several hrs., boiled and filtered, is found to have lost a large part of its secretin. Other glands show a similar fixation of the secretin, especially the liver. Egg albumin was found to exert a very slight fixation of the secretin, as was muscle, spleen, and kidney pulp; pancreatic and hepatic material thus have sp. combining powers toward secretin. Pancreatic exts. show no increased enzymic activity when mixed with secretin, while pancreatic juice shows an increased amylase and lipase activity after the addition of secretin. Secretin therefore does not react with the gland cells to produce enzymes or zymogens. H. C. BRADLEY.

Glucolysis in Blood. R. LEPINE AND BOULUD. *J. phys. path. gén.*, 13, 353.—A study of the free, potential, and total sugar factors of the blood. H. C. B.

Osmotic Properties of Muscle. H. LAUGIER AND H. BENARD. Sorbonne, Paris. *J. phys. path. gén.*, 13, 497.—The coördinate imbibition and loss of electrolytes by a frogs muscle are shown by curves. Tension on the muscle decreases the rate of imbibition of water. An increase of temp. from 13 to 37° produces an initial increase in the rate of imbibition, increases the total amt. of water taken up, and produces a subsequent rapid loss of the imbibed water. The membrane thus does not follow the laws for simple semipermeable membranes. H. C. BRADLEY.

Carbohydrates of Normal Urin. GILBERT AND BAUDOUIN. *J. phys. path. gén.*, 13, 596.—The amt. of reducing substances excreted normally in the urin, consisting of glucuronic acid, pentoses, and alimentary glucose, estd. in terms of glucose, varies from 0.25 to 1.24 g. per 24 hrs. H. C. B.

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Recent Work in Physiological Chemistry. P. RONA. Berlin. *Med. Klinik*, 7, 1396–7.—A review of work with "optical methods;" elastin and pepsin, and on metabolism. P. J. H.

Note on a Peptide-splitting Enzyme in Woman's Milk. LOUIS M. WARFIELD. Milwaukee Co. Hosp., Wauwatosa, Wisc. *J. Med. Res.*, 25, 235–7.—A peptase which splits glycyltryptophane was found in milk from healthy women as well as from a case of myocardial incompetency. The enzyme is destroyed at 75–80°, but not at 60°. Dil. HNO_3 or HCl inhibits its action, but formaldehyde concs., such as are employed in the preservation of milk, do not. A similar peptase has been found in saliva.
F. C. KOCH.

The Composition of the Animal Body. R. INABA. *Arch. Physiol.*, 1911, 1–8.—Analyses of the bodies of young and embryonic mammals, reptils, and fish showed that morphologically similar animals were also similar in the comp. of their bodies. In young or embryonic animals a lower ash content corresponded with the developing osseous framework of the body. Warm-blooded animals were richer in fat than were cold-blooded. The ash and fat free dried substance corresponded to the protoplasm of the living animal, and had the same calorific value in all animals, but lower than the calorific value of proteins. All protoplasm seemed to be similarly built up.
H. B. LEWIS.

The Sense of Taste. R. FOERSTER. *Wochschr. Brau.*, 28, 400–3.—Conditions influencing the sense of taste, intensity and time of reaction are discussed. A bibliography is appended. C. A. NOWAK.

The Bile Pigments. I. HANS FISCHER. II. med Klinik, München. *Z. physiol. Chem.*, 73, 204–39.—The formula $C_{16}H_{18}N_2O_3$ for bilirubin is confirmed. Maly's hydrobilirubin is a mixt. of inconst. comp. If an alk. soln. of bilirubin is treated with Na amalgam in the absence of O, it is decolorized in 1–2 hrs.; on then acidifying and extg. with $CHCl_3$ there is obtained *hemibilirubin*, $C_{16}H_{22}N_2O_3$ or $C_{16}H_{20}N_2O_3$, large colorless prisms from AcOEt + ligroin, m. 192°; yield, 46%; in air it changes into a reddish orange and finally a brown pigment, both giving the reactions and spectrum of urobilin. Oxidation of hemibilirubin with CrO_3, PbO_2, or HNO_3 gives hematinic acid or its oxime; yield in each case very small. Reduction of bilirubin with AcOH, HI, and PH_4I did not yield hemopyrrole; the latter is not the urobilinogen of urin, which is probably identical with hemibilirubin. Stercobilin (urobilin) was prepared in a yield of 160 g. from 1005 g. fecal stools. After an elaborate purification it had 65.88% C, 7.80% H, 5.05% N; it is therfore not identical with hydrobilirubin, which has 9.22% N. On dry distillation it yields a fluorescent oil; on reduction with Zn and AcOH a N-free amorphous substance with cholesterol reactions; on reduction with Zn and HCl pyrrole derivs. It is therefore a mixt. of a nitrogenous substance with a bile-acid or cholesterol deriv. Urobilinuria probably indicates primarily a disturbance in the metabolism of the last-named substances. Koprosterin (yield from 1005 g. stools = 40 g.) is $C_{27}H_{48}O$; recryst. from acetone it m. at 112–6°. In the bile acid fraction of the fecal ext. were identified desoxycholic and fellic(?) acids. From the ether ext. of ox gallstones, decomp. by HCl, was isolated *lithocholic acid*, $C_{24}H_{40}O_3$, long needles from dil. alc., m. at 184°, $[\alpha]_D^{20}$ +32.14°. The bile acids can hold bilirubin in colloidal soln.; taurocholic has a greater effect in this respect than glycocholic acid.
A. HUNTER.

The Influence of Bile Salts and their Combination with Enterokinase on the Ferments of the Pancreas. V. G. KOREHCHEVSKII. Imp. Inst. Exp. Medicin, St. Petersburg. *Arch. sci. biol.*, 16, 271–8.—The action of pancreatic amylopsin and of steapsin

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is accelerated by intestinal juice and by bile salts, and more conspicuously, by a mixt. of the 2. A. F. BLOOD.

Peroxidases in Milk (VAN ECK, GRUMMER). 12.

G. PATHOLOGY.

H. GIDEON WELLS.

The Influence of Experimental Anemia on the Secretion and Composition of the Bile. V. G. KOREHCHEVSKII. Imp. Inst. Exp. Med., St. Petersburg. *Arch. sci. biol.*, 16, 253–71.—The secretion of bile incited by similar meals was detd. before and after bleeding. The removal of 40% of the blood of dogs is followed by a diminished secretion of bile and bile salts. The bile is slightly more conc. than normal.

A. F. BLOOD.

The Detection and Clinical Significance of Urobilinogen and Urobilin. E. MÜNZER AND F. BLOCK. *Arch. Verdauungs-Krankhe.*, 17, 260–92.—Urobilin does not occur as such in urin but as urobilinogen. In healthy urins it is present only in traces. Larger amts. indicate more or less derangement of the liver. Amyl alc. dissolves benzaldehydeurobilinogen almost quantitatively. A. F. BLOOD.

The Behavior of the Glycogen of Frogs during Anoxybiosis and Restitution. ERNST J. LESSER. Lab. städt. Krankenanstalten, Mannheim. *Z. Biol.*, 56, 467–504.—During anoxybiosis there is a marked hydrolysis of glycogen in the liver and in the muscles similar to the "post-mortem" changes in the liver of warm-blooded animals. Part of the sugar is changed in an unknown way, but a part remains as such and is reconverted into glycogen in 3–5 hrs. after restitution. A. F. B.

Effect of Intestinal Occlusion upon Blood. G. BOLOGNESI. *J. phys. path. gén.*, 13, 220.—Occlusion of the small intestin in rabbits produces an increase in the viscosity of blood and serum, together with a marked decrease of serum proteins (Esbach's method used). The most marked changes follow ligation high up on the duodenum. H. C. BRADLEY.

Antitoxic Sera and Cerebrospinal Fluid. H. LEMAIRE AND R. DEBRE. *J. phys. path. gén.*, 13, 233.—Forty-eight hrs. after the subcutaneous injection of antitetanic horse serum into a dog, the cerebrospinal fluid of the latter was removed blood-free. It was found to contain no horse serum proteins by the precipitin reaction. It exercized a slight protective action upon pigs inoculated with tetanus. The blood from the same dog gave abundant horse-protein reactions and protected 10,000 times its wt. of inoculated pigs. The transfer of the antitoxic serum to cerebrospinal fluid is practically nil. A previous injection of morphine allowed a slightly larger amt. of the antitoxic substance to penetrate the cerebrospinal cavity, but it was practically insignificant. The expt. confirms the clinical observations as to the necessity of injecting curative sera into the cerebrospinal space, to affect the meninges.

H. C. B.

Mechanism of Anaphylactic Sera. M. BELIN. Tours. *J. phys. path. gén.*, 13, 372.—The transformation of a protoxogen into a toxogen is accomplished by oxidation. This was done *in vitro* by means of various salts and contact with air or O. The toxogen itself is rather quickly destroyed by oxidation. H. C. B.

The Composition of Serous Fluids. A. JAVAL. *J. phys. path. gén.*, 13, 508.—A study of the chloride and protein comp. of various serous fluids shows large variations in samples from the same locality. The av. comp. shows a decreasing protein content in the following order: Serum, ascitic, pleural edematous, and cerebrospinal fluids. Chlorides are found in the reverse order of the above list. H. C. BRADLEY.

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Specificity of Natural Hemolysins. A. MAYER AND G. SCHAFFER. *J. phys. path. gén.*, 13, 527. H. C. B.

Specificity of Acquired Hemolysins. A. MAYER AND G. SCHAFFER. *J. phys. path. gén.*, 13, 553. H. C. B.

Parathyreopriva and Acidosis. L. MOREL. Paris. *J. phys. path. gén.*, 13, 542.—Parathyroidectomy produces a characteristic train of symptoms indicative of auto-intoxication. Tetany is the most characteristic single symptom. In fatal cases, acidosis is a const. feature, leading to excessive excretion of N and mineral salts of lactic and diacetic acids. NH_3 of the blood is increased, utilization of dextrose diminished; the degree of acidosis parallels the intoxication though it does not produce it. Carbonic acid intoxication and acidosis prevent the normal antitoxic action of the liver. This loss of function by the liver allows substances to be present in the blood, intermediate products of protein metabolism, which produce the fatal intoxication. H. C. B.

The Passage of Diphtheria and Tetanus Antitoxin into the Aqueous Humor. V. MORAX AND G. LOISEAU. *Ann. inst. Pasteur*, 25, 647–60.—In an immunized animal it is possible to demonstrate the presence of antitoxin in the aqueous humor although the amount is far below that contained in the serum. Tetanus antitoxin titrated between 0.1 and 1.25 in the aqueous humor from a horse immunized with tetanus toxin, the titer of the serum being 1,000 to 100,000. The amount of antitoxin in the aqueous humor is not strictly proportional to the amt. in the serum. H. J. CORPER.

Researches on the Presence of Antibodies in the Aqueous Humor of Immunized Animals. (B. typhosus and Cholera Vibrion.) Y. MANOUÉLIAN. *Ann. inst. Pasteur*, 25, 661–8.—The aqueous humor of animals immunized with *B. typhosus* and the cholera vibrion contains antibodies whose presence was shown by the fixation of complement (Bordet-Gengou method) and by the agglutination and precipitin tests. The proportion of these various antibodies in the aqueous humor and in the serum was, resp., about 1 to 5,000. H. J. C.

Researches on the Supposed Bactericidal Action of the Aqueous Humor toward Anthrax Bacilli. Y. MANOUÉLIAN. *Ann. inst. Pasteur*, 25, 669–70.—Aqueous humor of normal rabbit and normal and vaccinated sheep possesses no bactericidal action toward *B. anthracis*. H. J. C.

The Nature of the Proteolytic Substances in the Blood. GEORGE F. DICK. Path. Lab., Univ. of Chicago. *J. Infect. Dis.*, 9, 282–6.—Using the optical method of Abderhalden, D. found a change of 0.23° when sheep-serum-immune—rabbit—serum acted upon sheep serum, with only 0.02° change when beef serum was substituted for sheep serum; a change of 0.35° when typhoid-immune rabbit serum acted upon salt soln. ext. of *B. typhosus*, with only 0.02° change when *B. coli* ext. was substituted. When normal rabbit serum acted upon sheep serum a change of rotation of 0.14° was obtained while heated serum gave only 0.09°. Heated inactivated serum (specific proteolytic serum) appeared to be reactivated by complement (guinea pig serum). It seems that the proteolytic substances of the blood are of a nature resembling that of immune bodies, especially the lysins. H. J. C.

Specific Antibodies in Scarlet Fever. KARL K. KOESSLER AND JESSIE M. KOESSLER. Memorial Inst. for Infect. Dis. *J. Infect. Dis.*, 9, 366–79.—The serum of scarlet fever patients contains specific antibodies for an unknown virus which do not seem to be present in demonstrable quantities before the onset of the second week and remain until about the 12th week. The unknown virus seems to be present especially in the cervical lymph glands. H. J. C.

Gelatinization of Albuminous Urin by the Addition of Acetic Acid. G. MARUZZI.

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Parma. *Med. Klinik*, 7, 1278–80.—The conditions necessary for this phenomenon are a high albumin content and small quants. of salts such as are found only in the most severe forms of nephritis. P. J. HANZLIK.

Hemolysin Content of Cerebrospinal Fluid in Acute Meningitis and Progressive Paralysis. E. WEIL AND V. KAFKA. Univ. Prag. *Med. Klinik*, 7, 1314–8.—In cerebrospinal fluid of meningitides, hemolytic amboceptors and complement were present, and in paralyses only amboceptors when the complement of blood is also diminished. The difference in reaction appears to be dependent in part on variations in permeability of the meningeal vessels but to a much greater extent on the hemolysin present in the blood of the particular individual. P. J. HANZLIK.

Alimentary Galactosuria of Nervous Origin. H. POLLITZNER. III med. Klin., Vienna. *Wien. klin. Wochschr.*, 24, 1393–6.—A woman with alimentary glucosuria of nervous origin excreted in the urin about 5% of the amt. of galactose (30 g.) fed. When 0.001 g. adrenaline was added to the same amt. of galactose, the amt. excreted was doubled. With 0.001 g. atropine the elimination of sugar was little changed (about 4%). After feeding 40 g. galactose, 13% of the amt. fed was excreted in the urin. H. B. LEWIS.

Heat-sensitive, Anticomplementary Bodies in Human Blood Serum. HANS ZINSSER AND W. C. JOHNSON. Lab., St. Luke's Hosp., New York. *J. Exp. Med.*, 13, 31–42.—The expts. serve to corroborate the observations of other workers that in many human sera, if not in all, there develops, on standing, anticomplementary substances which are delicately thermolabil, being inactivated by heating to 56° for 15–20 min. The thermolabil substance may be removed from inhibiting sera by pptg. the globulins. A soln. of the globulins then manifests a thermolabil, anticomplementary action. The results show that the complement fixation tests should never be made with certain sera which have been preserved for some time without inactivation. WALTER A. JACOBS.

Sublimate and the Serum Diagnosis of Syphilis. HIDEYO NOGUCHI AND J. BRONFENBRENNER. Rockefeller Inst., New York. *J. Exp. Med.*, 13, 210–6.—With the idea of ascertaining the cause of the disappearance of the serum reaction of syphilis after the commencement of mercurial treatment the authors studied the effect of $HgCl_2$ on red cells, complement, amboceptor, antigen and antibody. The expts. showed that $HgCl_2$ in the highest non-hemolytic quantity (0.0000025 g.) failed to remove to a noticeable degree the syphilitic antibody and the reaction in two strongly positive sera remained unchanged. With antigen the results were the same. W. A. J.

Effects of Mechanical Agitation and of Temperature upon Complement. HIDEYO NOGUCHI AND J. BRONFENBRENNER. Rockefeller Inst., New York. *J. Exp. Med.*, 13, 229–33.—Under certain conditions mechanical agitation destroys the complementary activity of guinea-pig serum. It is most injurious when carried on at 37°, the most rapid destruction occurring after several hrs. After 6 hrs. it is complete. At temp. above 45° the destruction is progressively more rapid as it approaches 55°. At this temp. the activity is reduced in 30 min. to 1/30 to 1/40 of the original strength of the unheated serum, but not completely destroyed as commonly assumed. W. A. J.

Chemo-immunological Studies on Localized Infections. III. Some Further Observations upon the Action of Certain Soaps on the Pneumococcus and its Experimental Infections. RICHARD V. LAMAR. New York. *J. Exp. Med.*, 14, 256–64.—*In vitro* Na linoleate and Na linolenate kill and dissolve virulent pneumococci more rapidly and in higher diln. than Na oleate; otherwise their action is the same. The intensity of action on the cocci is directly proportional to the degree of unsatn. of the acid.

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Blood serum inhibits the bacteriolytic and hemolytic action of unsatd. soaps partially or completely, according to definitive quant. relations between serum and soap. Small quantities of serum completely inhibit the action of dil. soap solns., but even whole serum does not prevent bacteriolysis and hemolysis by relatively conc. soap soln., *i. e.*, 1% and 0.5%. A given quantity of serum inhibits the action of the soaps in inverse ratio to their degree of unsatn. The hemolytic and bacteriolytic action of soaps of the unsatd. fatty acids is probably due in part to their affinity for protein and not wholly to their lipoid-dissolving power. Attempts to prevent serum inhibition of the lytic action of Na linoleate and linolenate were unsuccessful. The more unsatd. soaps are not as efficient in preventing fatal pneumococcic infection of animals as Na oleate. W. A. J.

Complementoid and the Resistance of the Mid-piece of Complement. HENRY K. MARKS. Hosp., Rockefeller Inst., New York. *J. Exp. Med.*, **13**, 590–4.—In expts. on the isolated mid-piece, M. in agreement with Hecker and Tsurusaki (*Arb. Inst. exp. Ther. zu Frankfurt a/M.*, 1907, No. 3, 39) was unable to demonstrate its thermostability. In the more normal unisolated condition, however, its thermostability was proven. Guinea-pig serum inactivated by heating at 55° for 20 min. to 1 hr. was tested against sheep corpuscles laden with amboceptor. Upon addition of the necessary amt. of guinea-pig end-piece hemolysis occurred, showing that the mid-piece or haptophore group of the complement was unaffected by heating. In expts. with the mid-piece isolated from the inactivated serum its complementing action was as great or even greater than that of the whole inactivated serum. W. A. J.

The Resistance of the End-piece and Mid-piece of Complement Inactivated by Distilled Water. HENRY K. MARKS. Hosp., Rockefeller Inst., New York. *J. Exp. Med.*, **13**, 652–6.—Although serum incubated with 9 pts. of dist. water had lost its complement activity, it was found on addition of fresh end-piece to its globulin fraction (mid-piece) that active hemolysis occurred. On the other hand it was shown that the albumin fraction obtained from the complement inactivated by dist. water, showed hemolysis in combination with fresh globulin fraction. W. A. J.

The Toxic Action of Certain Normal Sera and its Relation to Anaphylaxis. HANS ZINSSER. Leland Stanford Univ., Cal. *J. Exp. Med.*, **14**, 25–43.—Normal goat serum is toxic for rabbits, when intravenously injected, in doses varying from 2 to 5 cc. *In vitro*, the goat serum hemolyzes and agglutinates rabbit corpuscles. When heated to 56°, it loses its toxic and hemolytic properties but not its hemagglutinating property. The addition of fresh rabbit complement to inactivated goat serum reactivates neither hemolysis nor toxicity. The addition of fresh guinea-pig complement, however, reactivates the hemolytic but not the toxic property. When fresh, toxic, goat serum is mixed with a large excess of washed rabbit corpuscles until no further hemolysis takes place, and until all determinable traces of amboceptor and complement for rabbit cells have disappeared, the supernatant fluid of such mixts. is toxic in the same way as the original serum. This toxicity does not depend upon the products of laked blood in it, nor upon unremoved stromata. This toxicity is, also, proportionate to the amt. of original serum contained in the injected quantity of supernatant fluid, and is destroyed by heating to 56° as was the toxicity of the original serum. From these facts, Z. concludes that the toxic action of goat serum upon rabbits depends upon a heat-sensitive factor independent of hemagglutinins and probably of hemolysins. Other expts. and considerations on the relation of phenomena following the injection of normal toxic sera into rabbits and other susceptible animals to true anaphylaxis were without definit result. W. A. J.

Studies in Immunity and Anaphylaxis. The Proteins of the Kidney and Liver. R. M. PEARCE, H. T. KARSNER AND A. B. EISENBRAY. Univ. of Penn. *J. Exp.*

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Med., 14, 44–58.—The sera of rabbits injected repeatedly with the nucleoproteins, globulins and albumins of the liver and kidney of the dog give no evidence *in vitro* or *in vivo* expts. of organ affinity. The precipitin test offers no proof of the specificity of these sera for the proteins employed as antigens. The anaphylaxis reaction applied to the same proteins indicates a slight relative organ affinity, but no specificity as far as the respective protein fractions are concerned. The relative organ affinity resides in the globulin and albumin fractions rather than in the nucleoprotein fraction. Dog serum used both as a sensitizing and intoxicating agent gives rise to very active cross reactions with organ proteins, thus failing to support the theory of organ or of protein specificity. These results do not support the view that nucleoproteins play an important part in the course of production of cytotoxic immune sera. W. A. J.

The Hemolysins of Sera from Cold-blooded Animals. H. H. Liefmann. Berlin. *Ber. klin. Wochschr.*, 48, 1682–3.—Frog blood serum was found to contain a complement for rabbit erythrocytes. This complement resembles that from warm-blooded animals in that it also may be divided into the 2 fractions, euglobulin and pseudoglobulin, both of which must be present to cause hemolysis. It also resembles the warm-blooded complement as to the effect of salt solns., of conc. of the complement and as to the decrease in conc. after hemolysis. Eel serum contains a similar complement. F. C. Koch.

Precipitation Tests for Syphilis. Lawrence W. Strong. Manhattan Eye, Ear and Throat Hosp. *J. Med. Res.*, 25, 199–204.—In a series of cases, S. compared the pptn. test of Herman and Peritz (cholesterol antigen) with the Noguchi acetone-insol.-heart-muscle-emulsion method. In 65–70% of the cases the results agree. In some cases of syphilis under treatment one or both methods gave negative results. Both give positive results in some other pathological conditions. Na glycocholate acts fairly const. as a precipitant, but may yield entirely negative results in syphilitics where the Noguchi test is positive. Confirms Noguchi in that the ppt. formed is a globulin and that the antibody is pptd. with it. Results indicate that the albumin fraction may react positively only when the serum is very strongly positive. The importance of observing proper concs. in the tests and that the tests no doubt depend on the variations in the globulin conc. in the serum are indicated. Other diseases than syphilis may bring about an increase in the globulin content of the serum. F. C. K.

An Experimental Comparison between "606," Mercury and Potassium Iodide as Antisyphilitics. James McIntosh and Paul Fildes. Bact. Lab., Lond. Hosp. *Lancet*, 181, 940–1.—Fifty-six days after testicular injection of a rabbit with syphilis 0.1 g. "606" was injected intravenously. Numerous spirochaetae at once became very mobil, then gradually became motionless and 6 1/2 hrs. after the injection all were fragmented. No spirochaetae were found the next day and after 16 days the ulcer was entirely healed. In another similarly infected rabbit, 58 days after the infection the injection of 0.005 g. HgI_2 had no noticeable effect. A second injection of 0.008 g. 3 days later left no spirochaetae 5 days after the first injection and the ulcer was well healed in 24 days. KI was of no value. The doses of "606" and Hg used represented resp. 1/6 and 3 times the adult human doses. F. C. K.

Further Studies on the Hydroxyl Ion Concentration of Pathological Blood. C. Kreibich. Dermat. Klin., Prague. *Wien. klin. Wochschr.*, 24, 1419–20.—The alkalinity of the blood measured as OH^-, conc. showed a marked decrease in diabetic coma, uremia and in the dead body. The centrifuged serum was more alk. than the whole blood, but the alkalinity of serum left in contact with the blood clot for a few hrs. decreased till it equaled that of the whole blood. Since the alkalinity of the centri-

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fuged serum did not alter in the same time, the cause of the change in alkalinity seemed to lie in substances which entered the serum from the red blood corpuscles.

H. B. LEWIS.

The Presence of Neutral Sulfur in the Urin and its Value in the Diagnosis of Carcinoma. E. E. PRIBRAM. *Wien. klin. Wochschr.*, 24, 1235–40. H. B. L.

A Hemolytic Precipitation Reaction. G. KELLING. *Wien. klin. Wochschr.*, 24, 1332–5.—The test indicated a hemolysin for chicken's blood corpuscles in the serum with cancer even when the latter was not palpable. There was also present a hemolytic immune body, an amboceptoid, and a substance with the power to deviate complement, which was found in the stroma of the corpuscles. H. B. L.

Protein Anaphylaxis Produced by Breathing. B. BUSSON. Hygien. Inst., Graz. *Wien. klin. Wochschr.*, 24, 1492–7.—Guinea pigs were sensitized by inhalation from dil. ox serum. The animals in the anaphylactic state could not be desensitized by inhalation from ox serum. An intraperitoneal reinjection of the antigen caused anaphylactic symptoms. The protein taken in by the animal through the lungs caused local inflammations and hemorrhages, which may be considered as local anaphylatoxin effects, analogous to the localized skin necrosis in subcutaneous injection of the antigen.

H. B. L.

The Relation of the Spleen to the Fixation of Antigens and the Production of Immune Bodies. A. B. LUCKHARDT AND F. C. BECHT. Hull Physiol. Lab., Univ. Chicago. *Am. J. Physiol.*, 28, 257–74.—Asplenic dogs produced specific hemolysins, hemoagglutinins, and hemopsonins less rapidly and in lower conc. than the control animals on which simple laparotomy had been performed. Antigens are fixed by the spleen, for when an optimum dose of antigen (rat's or goat's blood) is injected intravenously into a dog, the spleen then removed aseptically, emulsified and injected intraperitoneally into a normal dog, the specific immune substances appear in the serum of the latter.

J. F. LYMAN.

The Ferment Nature of Complement. L. V. LIEBERMANN AND B. V. FENYVESSY. Hyg. Inst., Univ. Budapest. *Z. Immunität.*, 11, 295–303.—A critical review of the various items of evidence on which is based the prevailing view that complement is a proteolytic enzyme, leads the authors to the conclusion that this evidence is not valid because of erroneous interpretations of the quant. relations of complement action.

H. G. W.

Investigations on the Method of Action of Complement. LIEFMANN AND ANDREW. Bakt. Abt. Rudolf. Virchow Krankenhaus, Berlin. *Z. Immunität.*, 11, 355–61.—The action of complement is dependent in a large degree upon the concentration. However, this fact can be accepted only with great caution as evidence of the ferment character of complement, for other substances which certainly are not ferments (such as saponin) show a similar relation of effect to conc. H. G. W.

The Haptophore Groups of Agglutinable Substance. H. RAUBITSCHEK AND M. WILENKO. Path.-bakt. Inst., Landeskrankenanstalt, Czernowitz. *Z. Immunität.*, 11, 375–88.—By satn. expts. it was determined that the haptophore groups of erythrocytes are mostly the same for different phytagglutinins. Serum hemolysins occupy different haptophore groups of corpuscles from those occupied by serum agglutinins. The haptophore groups of agglutinable bacterial substance are identical for all normal and immune agglutinins. H. G. W.

Idiosyncrasy against Bromine and Quinine as a Reaction of Hypersensitization. E. MANOILOV. Hyg. Lab. Klin. Inst., Grossfürstin Helena Pawlowna, St. Petersburg. *Z. Immunität.*, 11, 425–36.—The serum of persons susceptible to Br salts or quinine,

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injected into guinea pigs, produces condition of passive hypersensitization to the drugs mentioned. H. G. W.

Formation of Anaphylatoxin by Use of Plague Bacilli as Antigen. F. VAY. Suez, Port Tawfiq. *Z. Immunität.*, 11, 436–69.—Successful results, using Friedberger's method. H. G. W.

The Behavior of Hemolytic Complement and its Components against Certain Influences. H. GUGGENHEIMER. Königl. Inst. exp. Therapie, Frankfurt a/M. *Z. Immunität.*, 11, 393–411.—By digestion of sensitized corpuscles with guinea-pig serum in hypertonic NaCl soln. hypersensitization can be accomplished, but quant. fixation of mid-piece was never observed; the reaction is reversible, mid-piece being given off by the sensitized corpuscles to the salt soln. The action of end-piece on persensitized blood is inhibited by hypertonic salt soln. without injury to its function. HCl and NaOH destroy both components of complement, mid-piece being the more sensitive. Mid-piece fixation is inhibited by alkaline, not by acid reaction. Inactivation of complement by shaking with ether involves both components, but isolated mid-piece is less injured when suspended in water and shaken with ether; it is sometimes more thermolabil than end-piece. H. G. W.

The Anaphylactogenic Function of Horse Complement. C. MORESCHI AND A. PERUSSIA. Inst. Gewerbkrankheiten, Milan. *Z. Immunität.*, 11, 416–25.—The antigenic function of complement is shown by production of active anaphylaxis to horse serum, on sensitizing guinea pigs with ox corpuscles to which horse complement has been bound. H. G. W.

Anaphylaxis. XXI. Mechanism of Complement Action in Formation of Anaphylatoxin in Vitro. E. FRIEDBERGER AND T. ITO. Pharm. Inst., Univ. Berlin. *Z. Immunität.*, 11, 471–8.—Anaphylatoxin is split out of antigen only by intact complement or by united mid- and end-piece; not by either of these components alone. **XXII. Influence of the Quantity of Bacteria upon the Formation of Anaphylatoxin in Vitro.** E. FRIEDBERGER AND S. GIRGOLAFF. *Ibid.*, 479–84.—Corroboration of former results, that when a constant amt. of serum is used the amt. of anaphylatoxin formed is dependent upon the amt. of antigen employed. **XXIII. Influence of Leucocytes on Anaphylatoxin Formation.** E. FRIEDBERGER AND Z. SZYMANOWSKI. *Ibid.*, 485–92.—The intensity of formation of anaphylatoxin *in vitro* is decreased by presence of leucocytes, and they also decrease strength of prepared anaphylatoxin upon which they are allowed to act. **XXIV. Formation of Anaphylatoxin from Dysentery Bacilli and Dysentery Toxin.** E. FRIEDBERGER AND H. REITER. *Ibid.*, 493–500.—Fatal amts. of anaphylatoxin produced with dysentery bacilli in quantities of 0.01 g. dried bacteria, and upwards; for this amt. of bacteria 3 cc. serum furnishes the optimum amt. of complement. Excess of either complement or bacteria decreases amt. of anaphylatoxin. Addition of complement to dysentery toxin does not produce an anaphylatoxin. **XXV. Action of Atropine in Active Anaphylaxis.** S. MITA. *Ibid.*, 501–14.—M. could not establish the protective action of atropine upon active anaphylaxis. It does not modify the natural toxicity of bovine serum for normal guinea pigs. **XXVI. Can Kaolin Bind Amboceptor?** E. FRIEDBERGER AND P. SALECKER. *Ibid.*, 574–88.—Kaolin acting on undiluted serum is able to adsorb completely the complement, but does not adsorb demonstrable amts. of amboceptor. This fact is interpreted in favor of F.'s view that anaphylatoxin is formed by cleavage of the antigen, and against Keysser and Wassermann's view of the origin of anaphylatoxin from amboceptor. H. G. W.

Bacterial Anaphylaxis. A. SEITZ. Hyg. Inst., Univ. Königsberg. *Z. Immunität.*, 11, 588–608.—Normal serum of guinea pigs extracts from many bacteria something which gives effects very similar to anaphylatoxin. Bacteria heated to 100° and serum

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heated to 56–65° yield the same poison. Living and dead bacteria injected into the blood produce similar effects. Self-digestion, or digestion with trypsin, does not produce exts. giving the symptoms of anaphylaxis. H. G. W.

Fixation Experiments with Protein Treated with Osmic Acid. BRUNO BUSSON. Hyg. Inst., Graz. *Z. Immunität.*, 11, 515–27.—Treating red corpuscles of ox with OsO_4 destroys antigenic function, but not fixation of antibody, which latter is, however, rendered non-specific. Sensitization with swine serum treated with OsO_4 and re-injection after 27 days of the same serum, results only in rise of temp.; if the re-injection is with normal serum there is no effect whatever. Sensitization with normal serum and injection of OsO_4 serum just before the re-injection of normal serum, reduces greatly the reaction produced by the latter. H. G. W.

Structure of Opsonins, Bacteriotropins and Agglutinins. TH. J. BÜRGERS AND W. MEISNER. Hyg. Inst., Königsberg. *Z. Immunität.*, 11, 528–56.—The opsonin of normal serum shows a comp. analogous to that of complement and amboceptor. All bacteriotropic sera are increased in activity by small amts. of normal serum and the same is true, to a less degree, with agglutinins. The bacteriotropic action of many immune sera is not observed in some instances because of the absence of complement; this, perhaps, accounts for the different results of expts. *in vivo* and *in vitro*. H. G. W.

Alteration of Amboceptors by Iodine. V. DUNGERN AND HIRSCHFELD. Krebs. Inst., Univ. Heidelberg. *Z. Immunität.*, 11, 557–73.—Hemolytic immune sera can be so iodized that the agglutinins remain, while the hemolytic action is reduced or destroyed. This is because the amboceptor is so altered that antigen-amboceptor complex has less affinity for complement. The complement-binding antibody behaves the same after iodizing as do the amboceptors, while the precipitins may remain unaffected. By iodizing the antigen strongly, the complement fixation may be entirely prevented. Iodized serum also is deprived of the substances active in the Wassermann reaction. Toxic action of hemolytic immune sera is much reduced by I. The anaphylactic antibodies of sera are much decreased in activity, even when the precipitin of the same serum is unaffected by the I. The natural toxicity of rabbit antisheep serum is much reduced by I. Attempts to affect anaphylactic properties of antigens with I gave inconstant results. Iodization of proteins decreases digestion by trypsin, but increases digestion by autolytic enzymes. H. G. W.

Antibody Formation against Tissues of the Same Organism. J. HALPERN. Inst. f. exp. Krebsforschung, Heidelberg. *Z. Immunität.*, 11, 609–39.—By intraperitoneal injection into dogs of tissue from dog organs H. obtained auto-antibodies in the serum, giving complement fixation reactions; spleen antibody was much less active than antibodies for kidney, liver and testicle. These antibodies were only partly organ-specific and generally not species-specific. The same sera contained hemagglutinins reacting with corpuscles of some dogs. Injection of pancreas increased the antitryptic action of the serum, the antitrypsin being destroyed at 70°. H. G. W.

Anaphylatoxin. O. KAMMANN. Staat. Hyg. Inst., Hamburg. *Z. Immunität.*, 11, 659–72.—Anaphylatoxin seems to be similar to certain basic fragments of proteins, which cannot be obtained by normal ferment action or by chem. disintegration. H. G. W.

The Enzyme Produced in Protein Sensitization. V. C. VAUGHAN, V. C. VAUGHAN, JR. AND J. H. WRIGHT. Hyg. Lab., Univ. Mich. *Z. Immunität.*, 11, 673–82.—Serum and organ exts. of sensitized guinea pigs, incubated with the same protein as used for sensitizing, cause the formation of a poison similar in action to the poison formed from protein by treating with alcoholic NaOH. Normal guinea-pig serum and organ

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exts. do not have this property. It is inactivated at 56°, and produces its sp. effects within ½ hr. at 37°; the inactivated serum and organ exts. are reactivated by normal inactive serum or exts. H. G. W.

The Organ Specificity of the Developed Lens and its Species Specificity in Embryonal Stages. AUREL VON SZILY. Univ. Augenklin., Freiburg i/B. *Klin. Monatsbl. f. Augenheilkunde*, 12, 156; through *Z. Immunität.*, Ref., 4, 485.—The lens proteins of adults is secondarily transformed protein which has been derived from different primitive anlage with sharp specificity. This specificity is lost when the ciliary processes take on the secretion of the ocular fluids. Embryonal lenses show close relation to the species, losing this species specificity in the course of development. The organ specificity is a secondarily acquired property of lenses. H. G. W.

H. PHARMACOLOGY.

ALFRED N. RICHARDS.

Phlorhizin and Phloretin-Glucuronic Acid. Jos. SCHÜLLER. Physiol. Inst., Kölner Akad. prakt. Med. *Z. Biol.*, 56, 274–308.—Phlorhizin administered to rabbits is excreted in part as phlorhizin glucuronate which can be isolated in cryst. form through its Pb salt. It is hydrolyzed by H_2SO_4 to phloretin glucuronate which in turn is hydrolyzed by Br to glucuronic acid and tetrabromophloretin. A. F. B.

Alcohol Diuresis. A. YANUSZKIEVIEZ. Univ. Kiev. *Z. Biol.*, 56, 401–67.—Alc. even in large quantities has no stimulating effect on the kidney (dog). The strong diuresis observed when alc. and water are administered is due to the stimulation of water absorption by the stomach. A. F. B.

Neuro-muscular Effects of Oxalic Acid Intoxication. SERVONAT AND ROUBIER. Lyon. *J. phys. path. gén.*, 13, 565.—Oxalic acid and its salts produce neuro-muscular effects such as paralysis or excitation. Clinically oxaluria is a frequent accompaniment of neurasthenia. Injections show a selective fixation especially by the nervous system. Muscular contractions are also modified by the presence of oxalates. H. C. BRADLEY.

Contributions to the Study of the Action of Beef and Horse Serum upon the Isolated Guinea Pig Heart. L. LAUNOY. *Ann. inst. Pasteur*, 25, 561–79.—Ringer-Locke soln. is not sufficient to sustain the beat of the guinea-pig heart. Addition of 2.5% to 5% of defibrinated cow blood sustains the beat for a long time and reinforces the amplitude of the contractions, which is associated with an arythmia and dicrotic type of contraction. Cow serum also re-enforces the heart beat but its tonic action is inferior to that of the whole blood, and its duration is shorter. Concs. above 5% do not act favorably. The products resulting from laking the red blood corpuscles have toxic effects upon the guinea-pig and rabbit hearts, arresting their beat. Horse serum acts similarly to that of cow but all the phenomenon noted are amplified by it. The max. action is in 5% conc. H. J. CORPER.

An Experimental Study of the Anatomical Changes Produced in the Heart as a Result of the Administration of Nicotine. C. v. OTTO. Kindlein Jesu-Hosp. in Warshau. *Arch. path. anat.* (*Virchow*), 205, 384–97.—Intravenous injections of Merck's pure nicotine in rabbits, extending over periods of 4–10 months produce an increase in the wt. of the heart, with anatomical changes in its musculature, these changes being parenchymatous and interstitial, and most conspicuous in the *Mm. pectinati*, then in the endocardium, less so in the myocardium and least in the epicardium. The ganglion cells of the heart are also affected, as is shown by their loss of Nissl substance and other degenerative changes. H. J. C.

Contributions to the Study of Chronic Alcoholism. FAHR. Path. Inst. d. allg. Kranken. Mannheim. *Arch. path. anat.* (*Virchow*), 205, 397–410.—The author has

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never succeeded in causing arteriosclerosis in rabbits or guinea pigs by alc. feeding. Fatty changes in the liver are, however, found and also a reddening of the mucosa of the stomach. Microscopically the kidney, pancreas, aorta, vagus and sympathetics were normal. Of 83 cases of human fatty liver examined (34 of these were from notorious alcoholics, while the remaining 48 were from a milder alcoholic type) only 4 were cirrhotic. There is no relation between the intensity of liver destruction and the misuse of alcohol. Alcoholic cachexia (bodily nourishment, under-nourishment) is an important factor here as in the power to withstand intercurrent diseases, pneumonia, etc. Examination of the peripheral nerves showed no inflammatory, but only degenerative changes in alcoholics. The fatty heart was not due to fatty muscle cells. The cardinal symptom of chronic alcohol poisoning is the fatty liver which can be, but need not be, accompanied by inflammatory changes. H. J. C.

Comparison between the Cardiovascular Action of Cocaine and Stovaine. ZENAÏDE KAMENZOVE. Lab. Pharmacodynam., Geneva. *Arch. intern. pharmacodyn.*, 21, 5–26.—Cocaine produces vasoconstriction with a variable pulse rate; stovaine a mild general vasodilatation. P. J. HANZLIK.

Action of Antipyretics. K. FERRI. Inst. Allgem. u. Exp. Path. Wien. *Arch. intern. pharmacodyn.*, 21, 27–40.—Rize in temp. produced by tetrahydro-β-naphthylamine can be neither diminished nor prevented by antipyretics. With this substance there is an increased heat production with diminished heat loss, while in infectious fever there is increased heat production with increased heat loss. In the former the hyperthermia is caused by a disturbance of the regulation mechanism. P. J. H.

The Action of Carbon Dioxide on the Blood and the Distribution of Red Blood Corpuscles. JULIUS V. MAGYARY-KOSSA. Budapest. *Arch. intern. parmacodyn.*, 21, 41–62.—CO_2 in H_2O acts more intensely on blood corpuscles than in the gaseous state and it exerts a deleterious action upon the stroma of nucleated corpuscles; the nuclei are more resistant. The spectroscopic changes brought about by CO_2 being similar to those due to dil. acids is further proof of the great resemblance between asphyxia and acidosis. When rabbits were subjected to prolonged dyspnea the P_2O_5 content of the blood was considerably increased, the H_2O content remaining unchanged and in the urin P_2O_5 was raised 94.82% and in the feces 58.18%. The explanation offered is that when CO_2 in excessive quantities acts upon the blood for some time, P_2O_5 is dissolved out of the corpuscles which then gives rize to the increased P_2O_5 content and consequent phosphaturia. During acute dyspnea (few mins. of CO_2 inhalation), the red blood corpuscles are diminished numerically in all peripheral vessels depending directly upon the pressure and in the large abdominal veins a polycythemia occurs which increases the viscosity of the blood and diminishes its mass movement. P. J. H.

Influence of some Diuretics on the Chlorine Excretion of Dogs. ANDREA SACCONE. Ist. Farmac. Terap., Univ. Napoli. *Arch. intern. pharmacodyn.*, 21, 63–75.—Caffeine and diuretin produce a diminution in the excretion of Cl in the urin. P. J. H.

Absorption of Hypertonic Sodium Sulfate and Magnesium Sulfate Solutions in the Small Intestin. PAUL WEISE. Pharmak. Inst., Univ. Jena. *Arch. intern. pharmacodyn.*, 21, 77–104.—A secretion of fluid into the intestin always occurs till an isotonic state is established (1/2 hr.). The SO_4^{--} either from a single soln. or a mixt. of both solns. was absorbed to the same % of the original quantity introduced. The higher the original conc. of either Na^+ or Mg^{++} above a certain point the greater their absorption. Absorption is practically the same in the small and large intestin. P. J. H.

The Action of Camphor and its Derivatives on the Heart of the Tortoise when

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Poisoned with Chloral Hydrate. ADRIEN LIPPENS. Inst. Thérap., Univ. Bruxelles. *Arch. intern. pharmacodyn.*, 21, 118–61.—There is no true antagonistic action of camphor and its derivs. against chloral hydrate nor can either diminish the toxic effect of the latter on the heart. P. J. H.

Action of Arsenic and Habituation. M. CLOËTTA. Pharmak. Inst., Zürich. *Corr. Blatt Schweiz. Aerzte*, 41, 737–42.—The feeding of As to animals raises their N content. If an individual remains absolutely inert to As medication he has a natural immunity to the metal. P. J. H.

Action of Sulfur on the Skin. L. GOLODETZ. Hamburg. *Med. Klinik*, 7, 1085–8.—Application of S to human skin forms H_2S, owing to presence of cysteine in the horny layer which goes over into cystine. The action of S on the skin is attributed to H_2S. P. J. H.

Active Principle of Adrenal Preparations in Combination with Local Anesthetics. P. ESCH. Pharmacol. Inst., Univ. Greifswald. *Med. Klinik*, 7, 1154–6.—Novocaine, alypin and especially cocaine possess greater anesthetic power in presence of adrenaline. P. J. H.

Changes which Iodine Preparations Undergo in the Stomach and Upper Duodenum. L. METZGER. Univ. Berlin. *Med. Klinik*, 7, 1390–1.—KI given *per os* to dogs with duodenal fistulas was detected in the duodenum in 5 min., absorption being complete in about 3 hrs. Organic I preps. are absorbed unchanged. P. J. H.

Iodine Excretion in Normal Men. E. HERZFELD AND M. HAUPT. Zürich. *Med. Klinik*, 7, 1426–7.—The excretion in urin following the administration of an inorganic salt (KI) varied from 0.52 to 89.14% and of an organic prep. ("jodosterin") from 0.32 to 79.85%. The diminished excretion after the organic prep. is explained on the basis of a closer relationship between organic preps. and animal tissues than that of an inorganic salt, the former being more readily assimilated. P. J. HANZLIK.

Physiological and Therapeutic Action of Large Doses of Radium Emanation. C. v. NOORDEN AND W. FALTA. I. med. Klinik, Wien. *Med. Klinik*, 7, 1487–91.—With large doses of the Em. the most important physiol. actions were a leucocytosis followed by a destruction of leucocytes with an increased excretion of uric acid. The emanations markedly influenced the metabolic processes and increased the irritability of the vegetative nervous system. P. J. H.

Changes in the Proteolytic Enzymes and Antienzymes of the Blood Serum Produced by Substances (Chloroform and Phosphorus) which Cause Degenerative Changes in the Liver. EUGENE L. OPIE, BERTHA I. BARKER AND A. R. DOCHEZ. Rockefeller Inst., New York. *J. Exp. Med.*, 13, 162–85; see *C. A.*, 5, 918. W. A. J.

Certain Features of Experimental Syphilis and Yaws in the Rabbit. HENRY J. NICHOLS. Washington. *J. Exp. Med.*, 14, 196–216.—It requires less salvarsan to cure yaws than syphilis. The spirochaetae of syphilis do not become resistant after repeated treatments with salvarsan. Na cacodylate has little effect on the treponema of either disease. Hg, in a single intravenous dose, has a spirillicidal effect, but the necessary dose usually causes death from nephritis. KI, in a single intravenous dose, has no spirillicidal effect. The complement fixation reaction is closely correlated with the course of an infection, as is shown by its onset and disappearance after castration or treatment. WALTER A. JACOBS.

The Diuretic Effect of the Amino Acids. K. GLAESSNER. *Therap. Monatsh.*, 25, 479–83.—Glycocol taken parenterally caused a diuresis accompanied by a slight increase in urea and Cl elimination. F. p. detns. showed an increase in Δ. No glycocol could be found in the urin. This diuretic effect was observed in normal conditions and nephritis, liver diseases, and heart diseases. H. B. LEWIS.

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Action of Lipoids on the Autolysis of Liver. G. SATTA AND G. M. FASIANI. Inst. allg. Path. Turin. *Arch. fisiol.*, 8, 497–512; through *Zentr. Biochem. Biophys.*, 11, 901.—The lipoids obtained from the heart, kidney, or muscle of a dog were found to activate a liver autolysis in proportion to the N content or the content of dry residue in the lipoid suspension. The acceleration, however, was not so great as that found (*C. A.*, 4, 3250) for liver lipoids. I. K. PHELPS.

The Elimination of Arsenic after the Intramuscular Injection of Dihydroxyaminoarsenobenzene. K. MUTO AND Y. SANNO. Pharmakol. Inst., Univ. Tokio. *Therap. Monatsh.*, 25, 599–601.—The elimination of As in the urin of men after the intramuscular injection of salvarsan reached a max. of 12–13% in 4–6 days after the injection. Nearly 66% of the As was excreted in the first 8 days, 5–6% being excreted on the 8th day. Traces of As were detected after 20 days. H. B. LEWIS.

The Therapeutic Value of Phytinum liquidum in Diseases of Children. H. DONATH. *Wien. klin. Wochschr.*, 24, 1192–7.—The feeding of phytin (K-Mg salt) to dogs with Pavlov fistulas caused an increased vol. of gastric juice, an increased acidity both in free HCl and in total acidity, and a slight decrease in pepsin. To this increased flow of gastric juice, the stimulating effect of phytin on the appetite is believed to be due. H. B. L.

Effects of Pilocarpine and Atropine upon the Amylolytic Power and Composition of the Saliva. E. M. EWING. Lab. Pharmac., Univ. Missouri. *J. Exp. Pharm.*, 3, 1–18.—Expts. were carried out on man. Pilocarpine in doses of 3–5 mg. increases the vol. and total amt. of solids in the saliva. The % content of the total solids remains unchanged or is slightly diminished. The amylolytic power of this saliva is materially lowered. Atropine (0.5 to 1 mg.) diminishes the amylolytic power 15–30%. The vol. and total % of solids, especially the organic constituents, is diminished. G. M. MEYER.

Influence of Caffeine on the Mammalian Circulation. I. Persistent Effects of Caffeine on the Circulation. TORALD SOLLMAN AND J. D. PILCHER. Western Reserve Univ., Cleveland, O. *J. Exp. Pharm.*, 3, 19–48.—With doses up to 20 mg. per kg. body wt. the blood pressure is not much affected. The heart rate is increased. With doses of 20–150 mg. the pressure falls to a const. level of 50–70 mm., depending upon the original pressure. The heart is increased and central vasomotor stimulation persists. Additional doses produce no further effects until death occurs by cardiac paralysis. The fatal dose for intravenous injections is 57–800 mg. per kg. (av. 175 mg.). **II. Influence of Blood Pressure on Cardiac and Vascular Reactions.** *Ibid.*, 48–51.—Circulatory reactions are generally reduced when the level of the blood pressure has fallen to 50–80 mm. and they are almost ineffective when the pressure is 45 mm. This lessened response depends mainly on the diminution of the quantity of blood in active circulation (increase of the blood vol. on the venous side and decrease on the arterial). **III. Influence of Caffeine on Blood-pressure Reactions.** *Ibid.*, 51–64.—Caffeine above a dosage of 40 mg. reduces some of the cardiac or vascular reactions; for others, a dosage of 60–140 mg. is required. Doses below 20 mg. do not reduce these reactions. Lessened response to sciatic stimulation, asphyxia and tetanus, indicate that caffeine depressed the peripheral vasomotor system. Caffeine in large doses also reduce the efficiency of the heart. **IV. Effects of Caffeine on the Vessels of Excized Organs.** *Ibid.*, 63–6.—These expts. showed that caffeine produces peripheral vasomotor depression by preventing constriction. **V. Acute Effects of Intravenous Caffeine Injections on the Circulation.** *Ibid.*, 66–93.—Intravenous injections of caffeine cause a slow and slight rize in blood and oncometer pressures, referable to the acute influx of fluid. This is followed by a sharp fall of blood pressure and oncometer indicating acute cardiac depression. At the immediate approach of death the blood and oncometer pressures continue to fall, indicating terminal cardiac paralysis. G. M. M.

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I. ZOOLOGY.

R. A. GORTNER.

The Chemical Composition of the Honey Bee at Different Stages of Development. J. STRAUS. Physiol. Inst., Univ. München. *Z. Biol.*, 56, 347–97.—Glycogen, fat, protein and chitin were detd. at various stages of development. The larvae increase rapidly in wt. with the storage of glycogen and fat amounting to 33% and 18% resp. of the dry wt. During the pupa stage these reserves rapidly diminish, the glycogen more rapidly than the fat. Changes are of the same type in the workers and drones but quant. differences were noted. A. F. BLOOD.

New Researches on the Physiologic Light of Pholas dactylus. RAPHAEL DUBOIS. *Compt. rend.*, 153, 690–2.—The luminous process in *Pholas dactylus* consists of the indirect oxidation of a nucleo-albumin, "luciferin," (coagulated at 95°) by a peroxidase (zymase), "luciferase" (destroyed at 65°). F. ALEX MCDERMOTT.

The Lethal Effect of Pure Distilled Water on the Vinegar Eel (Anguillula aceti). JAMES F. ABBOTT AND ETHEL L. RICHARDS. Zoöl. Lab., Wash. Univ., St. Louis. *Biol. Bull.* 21, 122–6.—*Anguillula aceti* succumbs in 6 days to pure H_2O free from electrolytes but it will live for longer periods in ordinary dist. H_2O. The toxic qualities of the pure H_2O perhaps reside in its solvent effect on the normally resistant cuticle of the worm which is rendered much more permeable to H_2O. The presence of electrolytes derived either from soln. of the glass culture tube or carried by "impure" dist. H_2O prolongs the life of the organisms apparently by preserving the character of the membrane so that the tissues will not imbibe H_2O. P. J. HANZLIK.

Lumbricin, the Hemolytic Substance of the Earth Worm. S. YAGI. Pharmak. Inst., Univ. Kyoto. *Arch. intern. pharmacodyn.*, 21, 105–17.—Lumbricin is a yellowish brown brittle substance, insol. in EtOH and $CHCl_3$, but sol. in Et_2O, C_6H_6 and toluene. The aq. soln. is neutral in reaction and dialyzable. Its Cd compd. is $C_{254}H_{388}O_{128}N_{47}SP_3(CdCl_2)_{19}\cdot 3H_2O$. Lumbricin has a hemolytic action on the blood of dog, cat, pig, rabbit, sheep and goat which is inhibited by normal sera and cholesterol and not increased by lecithin. It is thermostable and its action is enhanced by warming with acids or alkalies. P. J. HANZLIK.

12. FOODS.

W. D. BIGELOW.

The Dutch Alimentary Codex. A. J.-J. VANDEVELDE. *Rev. gén. chim.*, 14, 290–7. J. J. M.

Food Control in Basel-Stadt in 1910. H. KRELS. *Chem. Ztg.*, 35, 1078–9. J. J. M.

Honey and its Analysis. F. MUTTELET. *Ann. chim. anal.*, 16, 341; cf. *C. A.*, 5, 1131, 2275, 3305.—Ley's reaction is regarded as valuable in the hands of those who are experienced with its behavior in the case of samples of known character. Fiehe's test is reliable but can only be pronounced positive when the color produced is a cherry-red, permanent for at least 24 hrs. Orange or pink tints should be disregarded. In cases where the coloration might be caused by a partially caramelized honey the reaction is compared to that obtained with an overheated honey prepared from a centrifugal honey giving a negative Fiehe test. An overheated honey has lost many of its valuable characteristics and should no longer be allowed to pass as "natural" honey. A. F. SEEKER.

The Behavior of the Peroxidase in Cow's Milk when Heated. J. J. VAN ECK. *Chem. Weekblad*, 8, 692–702.—Starting with raw milk held at a const. temp. and re-

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moving at definit intervals 10 cc. and testing with Storch's reagent, the decreased enzymic activity due to heating can be traced. The reaction appears to be of the first degree and thus the equation $C_t = C_o/E^{act}$ is applicable. The value of α at 70.8° is 0.0276, at 71.45° 0.0462 and at 72.25° 0.0792. The widely different values reported for the death temp. of this peroxidase are doubtless due to the fact that there is no definit temp. at which the enzyme becomes inactive. The temp. found depends upon the rate of heating, so that the larger the vol. of milk used the lower the value of the death temp. It is evident that the color produced with Storch's reagent cannot give definit evidence of the pasteurization temp. as milk held sometime at 70° will show as little color as that heated quickly to 80° and immediately cooled.

H. S. BAILEY.

Glazed Coffee. H. KREIS. Basel. *Chem. Ztg.*, 34, 1040.—The Swiss limits in the judgment of glazed coffees need revision. The Storch reaction for resin in coffee can not be used because the oil of roasted coffee gives a similar coloration. In glazed coffee this oil conceals the reaction of the resin. K. recommends detg. the refractive value of the ether residue purified with ligroin; for coffee oils this is 72–74 at 40° (the ether residue gives variable values, often 100). Where resin glazes are used, when purified with petroleum ether, the values observed have been 77–93.

E. J. WITZEMANN.

The Detection of Resin in Glazed Coffee. T. VON FELLENBERG. *Mitt. Lebensm. Hyg.*, 1, 301–2; through *Chem. Zentr.*, 1911, I, 1253.—According to Kreis (preceding abstr.), the Storck reaction for resin is not applicable to roasted coffee, since coffee oil gives a similar permanent violet-red color with Ac_2O and H_2SO_4. The color reactions of pure resins are due to that group of isomeric resin acids called abietic acids. Since the substance which gives the color reaction of coffee is no acid, but an indifferent substance, which seems to belong to the furane group, the reaction for resin in coffee should be carried out as follows: About 10 g. coffee are treated with 15–20 cc. Et_2O for a few min. in the cold and the filtered ethereal soln. is shaken out with 2–3 cc. 5% Na_2CO_3 soln. This aq. alkaline soln. contains the free acids of coffee and the abietic acid as well as traces of coffee oil which may be removed by shaking 3–4 times with 10 cc. fresh Et_2O. The aq. soln. is then acidified with *N* HCl, extracted with Et_2O and the residue from the Et_2O soln. tested for abietic acid according to the Storck method. Shellac glazes as a rule give the reaction since they are usually adulterated with colophony. Pure shellac does not give the Storck reaction.

R. F. BACON.

A New Method for Determining the Quality of Wheat Flour. L. V. LIEBERMANN AND V. ANDRISKA. *Z. Nahr. Genussm.*, 22, 291.—The grade of flour being dependent upon its bran content a method was sought by which this could be detd. directly instead of employing the unsatisfactory classification according to color now in vogue. The following method was devized: Place 1 g. of finely divided flour in a tube 10 1/2–11 cm. long and shake vigorously with 10 cc. $CHCl_3$. Allow the mixt. to stand for 1 hr. and det. the bran content by comparing the color of the flour floating on the $CHCl_3$ with standards of known bran content prepared in the same way. Pure wheat bran for this purpose is prepared by b. a nearly starch-free sample with successive portions of water until the latter gives practically no reaction with I. The bran is then dried and finely ground. A bran-free flour is prepared by grinding pure wheat grits, the finished product giving only a faint pink color when 1 g. is shaken with 10 cc. $CHCl_3$ containing 5 drops of phloroglucine-HCl reagent. The standards are prepared by the intimate mixt. of various amts. of this flour and pure bran. The standard $CHCl_3$-flour mixt. may be kept for a week by covering with a layer of 1 cm. of glycerol.

A. F. SEEKER.

Some Points Concerning the Treatment of Wheaten Flour. A. E. HUMPHRIES.

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Chem. News, 104, 117.—Usually the yeast finds sufficient mineral matter in a flour but there are cases in which the addition of mineral phosphates increases the yield of gas in the dough. The acids, alkalies and salts have an influence upon the physical characteristics, tenacity and ductility of the gluten. The addition of very small percentages of salts natural to flour or wheaten ash increases the size of the loaf. In one case the mere addition of water, if made at a time substantially prior to dough-making, increased the strength of the flour to an extraordinary extent. During baking, a large proportion of organic P becomes inorganic. H. deems it advizable that millers be permitted, under control, to make use of advances in chem. knowledge in the treatment of wheats and flours, by adding, correcting or improving agents, like water, diastatic bodies, N yeast foods and salts natural to wheat or wheaten ash. P. A. YODER.

A Polariscopic Method for the Estimation of Malic Acid and its Application with Cane and Maple Products. P. A. YODER. *Z. Nahr. Genussm.*, 22, 329–50.—The method is based upon the difference in the polarization of malic acid with and without the addition of a uranyl compd., P_1—P, as per the equation:

$$\% \text{ malic acid} = \frac{(P_1-P).[1 + 0.001(t-20)].}{-28.8.0.5L}$$

in which t is the temp., L the length of tube in dm.; the polariscopic readings are given in degrees Ventzke for yellow light; cf. also *C. A.*, 5, 3478. P. A. YODER.

Cider Vinegar. F. E. MOTT. *J. Ind. Eng. Chem.*, 3, 747.—Adulteration of vinegar with foreign dextrorotatory material is detected by detg. the relative amts. of levulose and dextrose present in the solids. The necessary factors and formulas in this detn. are given. A. F. SEEKER.

The Determination of the Fat Content of Cattle Foods by means of Trichloroethylene. R. NEUMAN. *Chem. Ztg.*, 35, 1025–6.—In an attempt to find some substitute for $(Et)_2O$ as an extractive for fat in cattle foods, C_2HCl_3 was found very satisfactory. It may be easily purified by redistilling, need not be treated with Na, has a definit b. p. and comp. and is not inflammable. In practice 5 g. of the sample are shaken in a machine 1 hr. with 100 cc. of $CHCCl_3$, the solvent filtered off, care being taken to avoid evapn. and the fat in 50 cc. detd. in the usual way. The regular use of this method for several yrs. on 15 different kinds of press cake and cattle food (results compared with the regular $(Et)_2O$ method are tabulated) lead to the conclusion that it gives values from 0.11% lower on soy bean meal to 0.33% higher on corn mash than the $(Et)_2O$ extraction, is much safer, quicker, and probably gives nearer the actual oil content than the older methods. H. S. BAILEY.

Examination of Citron. F. HARTEL AND A. KIRCHNER. Kön. Unters. Hyg. Inst., Leipzig. *Z. Nahr. Genussm.*, 22, 350–3.—Methods of preparation and of chem. exam. are described. As the fruit is candied with mixts. of glucose and sucrose, the usual detns. for marmalade are all that are required, although the figures given also include salt, an impurity from the prep. The results of the exam. of 21 samples are shown. E. M. CHACE.

The Principles and Practice of Cider Making. B. T. P. BARKER. *J. Inst. Brewing*, 17, 425–41.—With respect to their use in the manuf. of cider, apples may be classified into 3 classes. (1) Sour—with the malic acid content above 0.45%; (2) sweet—with less then 0.45% malic acid and less than 0.20% tannin; (3) bitter-sweet—with usually less than 0.45% acid and more than 0.20% tannin. The character of must varies with soil and season. Attempts to improve cider by means of pure cultures have not been altogether successful, partly because of the heterogeneous nature of the apples usually employed. Attempts are being made to improve the nature of the raw products by cultivation and it is expected that more satisfactory results will then be secured of

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true cultures. Acidification and ropiness both occur with cider but the most common disease is that known as "sickness" which is liable to appear in sweet ciders during May and June. Attempts to prevent this disease during fermentation in cakes have not been successful. It is checked by blending juices of different classes by using a large proportion of the apples of the sharp or sour class or by early bottling.

W. D. BIGELOW.

Chemistry of Rennet Action with Special References to Emmenthaler Cheese. O. ALLEMANN AND W. MÜLLER. Liebefeld Swiss Dairy Bact. Inst., Berne. *Milchwirtsch. Zentr.*, 2, 385–95.—When 100 cc. of milk are treated at 35° with rennet and 15 cc. 1% AcOH and allowed to stand 10, 20 or 30 min., the amt. of N in the coagulum is largest in 10 min. and decreases somewhat with longer standing. Without acid the coagulation is less complete but does not decrease on standing. When milk is coagulated with rennet and allowed to stand from 30 min. to 8 hrs., the amt. of N in coagulum decreases with longer standing. These results support the proteolytic action of rennet on the protein coagulum. Some points of application in relation to Emmenthaler cheese are discussed as a basis for further expts.

L. L. VAN SLYKE.

Peroxidases of Milk. W. GRIMMER. Dairy Inst., Pommerania. *Milchwirtsch. Zentr.*, 2, 395–402.—The oxidizing action of raw milk is caused neither by inorganic catalyzers nor by alk. reaction. The peroxidases of milk are a function, perhaps, of milk albumin, or of some unknown substance closely related. The solubility and pptn. relations of peroxidases are the same as those of albumin in milk. Moreover, denaturizing of albumin is followed by destruction of the ferment, whether the action is brought about by heat, action of Me and Et alc., acetone or mixts. of these with ether, $CHCl_3$, alkalies or conc. acids. The ferment itself appears to be a protein, which has a certain resemblance to milk albumin in its physical and chem. properties, or it may be that the ferment has a strong tendency to be adsorbed by milk albumin; it is not of inorganic nature.

L. L. VAN SLYKE.

Method of Analysis of Tobacco Juices and Extracts and of the Commercial Salts of Nicotine According to the Method of Ulex of Hamburg. ESSNER. *Ann. chim. anal.*, 16, 339–41.—The method of Ulex seems the best of the many proposed. Soda lime is mixed with 4 times its wt. of plaster, and finely powdered. About 10 g. of tobacco juice or ext. are treated with this powder, thoroughly mixed and placed in desiccator over H_2SO_4, which absorbs NH_3. The whole is transferred to a flask and H_2O, 10 g. of NaOH and 10–15 g. of paraffin added. Six portions of 1000, 500, 200, 100, 100, 100 cc. resp. are distilled off and titrated with standard acid. Each cc. of the 0.5 *N* HCl = 0.081 g. of nicotine. E. obtains results within 1 g. in solns. containing 100–125 g. of nicotine per l.

A. W. BROOMELL.

Ash-free Gelatin (DHÉRÉ). 11. Determination of Phosphorus in Milk (SLONIEWSKI). 7. Interaction of Casein and Fat in Milk (KREIDL, LENK). 11.

U. S., 1,005,275, Oct. 10. T. G. MOLLINGER, Kalamazoo, Mich. **Sterilizing milk** by heating an attenuated body of milk to 130–155° for not more than about 2 sec., rapidly cooling to about 98°, bottling and sealing and then slowly cooling to about 70°.

U. S., 1,005,392, Oct. 10. F. M. WILSON, Hartman, and J. P. CAMPBELL, Lamar, Colo. **Alfalfa feed,** comprizing ground or comminuted alfalfa stems and uncomminuted alfalfa leaves mixed therewith in about the same proportions as in the natural hay.

U. S., 1,005,536, Oct. 10. J. E. J. GOODLETT, Memphis, Tenn. **Preparing stock**

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foods by impregnating dry base material with hot atomized molasses, stirring and heating the impregnated material, and conveying, drying and cooling it by air blasts.

U. S., 1,005,539, Oct. 10. J. G. GROTKASS, Bremen, and K. SCHIRM, Leipzig-Plagwitz, Ger. **Obtaining stable meat powder poor in fat and rich in nutrients,** from meat, fish, etc., by moving or stirring the material so as to subject it to friction and simultaneously treating it with flowing benzine vapor while heating the material and intermittently subjecting the material to the action of benzine vapor under pressure, the dried and degreased parts being removed in the form of a disintegrated fine mass form the pieces treated.

U. S., 1,006,175, Oct. 17. P. A. F. APPELBOOM, Rotterdam, Netherlands. **Preserving uncooked bacon** by placing it in a tin, adding about 0.2% H_2O, sealing the tin, heating to 120–130° for sufficient time to sterilize without cooking and then suddenly cooling.

U. S., 1,006,253, Oct. 17. A. MCDONALD, Henley, and A. BROWN-DURIE, Dunedin, New Zealand. **Apparatus for filtering milk.**

U. S., 1,006,841, Oct. 24. C. H. FREYER, Laddonia, Mo. **Bait for animals,** consisting of asafetida 3, fish oil 2 and goose oil 1 part.

U. S., 1,006,913, Oct. 24. H. E. COOKE, JR., Chicago, Ill. **Producing cocoa and cacao butter** by roasting the beans, cracking and fanning the shell from the cotyledons, then, without any chem. treatment, expelling the oil from the mass of cotyledons to such an extent that the product may be pulverized, and finally pulverizing and bolting.

U. S., 1,006,992, Oct. 24. E. WEINER, Vienna. **Sterilizing milk or cream with ozone** by exposing the liquid to ozonized air, in atomized form, and then aerating and removing the ozonized taste and preventing ozonized air from remaining in the liquid, the sterilizing and aerating being carried out in the same vessel, the sterilized air being conducted in jets through the liquid collecting in the lower part of the ozonizing vessel and the gases conducted away from a point above the surface of the collected liquid.

U. S., 1,007,046, Oct. 31. J. M. AGUAYO, Artamisa, Cuba. **Preserving milk** by excluding the atm. from it, treating it with O under 5–6 atm. pressure for some time and then subjecting it to O under less pressure.

U. S., 1,007,142, Oct. 31. J. C. W. RADEMACHER, Hamburg, Ger. **Solid meat and vegetable extract** mixed with fat and NaCl to form bouillon when dissolved in H_2O.

U. S., 1,007,599, Oct. 31. W. S. OSBORNE, New York, N. Y. **Desiccating milk,** etc., by circulating air upward through a closed chamber, showering the liquid by a rotary motion into the air so that the particles of liquid are caught up by the flowing air without coming into contact with the walls of the chamber, and carrying the resulting desiccated product out of the chamber by the current of air.

U. S., 1,007,622, Oct. 31. E. WÜRL, Prague, Austria-Hungary. **Making fodder cakes** by drying the material, *e. g.*, grass or roots, until brittle but partially moist and plastic, further drying to convert the residual moisture into steam which penetrates the material and renders it plastic, and finally pressing.

Ger., 229,602, Aug. 30, 1908. Addition to 218,817. R. MEIER, Berlin and M. F. HAHN, Hamburg. Mfg. **sausages containing fish flesh.** The smoked fish meat, before admixt. with other meat, is treated with hot or b. fat, especially with lard, to extract the constituents of the fish flesh which cause the fishy smell. The fish meat is also coated with a thin layer of fat (lard). The interior of the sausage casing can also be coated with lard before this mixt. is filled in.

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14. WATER, SEWAGE AND SANITATION.

EDWARD BARTOW.

The "Unsalting of Sea Water" by Aristotle; a Supplement. E. O. VON LIPPMAN. *Chem. Ztg.*, 35, 1189–90; cf. *C. A.*, 5, 2884. E. J. C.

Composition of the Mud and the Saline Water of Lake Tinak, Astrakhan. N. V. SOKOLOV. Lab. Imper. Russ. Techn. Soc. *J. Russ. Phys. Chem. Soc.*, 43, 436–9.—The water contains in g. per l.: Br, 0.501; Cl, 182.994; SO_3, 42.253; Mg, 39.5676; K, 0.8651; Na, 78.308. The radioactive mud, dried at 120°, contains in %: Sand and clay (insol. in HCl), 28.7; combustible matter, 20.826; FeS, 3.655; org. S, 0.686; SO_3, 18.81; SiO_2, 1.2; CO_2, 4.824; CaO, 14.3; MgO, 4.61; Al_2O_3 + Fe_2O_3, 2.27.

H. M. GORDIN.

The Action of Ultraviolet Rays on Drinking Water. I. L. SCHWARZ AND AUMANN. *Z. Hyg.*, 69, 1–16.—The authors use a 1200 c. p. Hg vapor lamp with a so-called under-water burner. The length of the light arc is approx. 6 cm. The current required is 4 amp. at 80 v. A 200 l. tank, containing the water, is connected with rubber tubing to the double quartz mantle Hg vapor lamp. One cc. sample of the raw water and of the exposed water were plated and the number of bacteria detd.; tests of enrichment samples of 10 and 200 cc. were made to det. the presence or absence of living germs. Using a "light vibrio" (germ content of 2000 per cc.), after 25 sec. exposure, all germs were killed. Plates with one cc. samples, after 20 sec. exposure, showed no colonies, though the enrichment samples of 10 and 200 cc. were positive. An exposure of 10 sec. reduced the numbers in 1 cc. amounts from 2100 to 15. Series of expts. were made with water to which were added, resp., "light vibrio," *B. coli*, *B. prodigiosus* and a spore organism that resisted streaming steam for 20 min. The rate of flow of the water was 2 l. per min.; the time of exposure, 3 sec. The temp. of the water before exposure was 8–10°, after exposure 10.5–12°. The germ content of raw water was 3000–10,000; after exposure, 3–25 per cc. When the length of exposure was 6 sec. and the rate of flow 1 l. per min., practically all bacteria were killed. Spore-bearing organisms were killed as readily as the others. A spring water with a germ content of 5–8 per cc. was almost completely sterilized during an exposure of $1^1/_2$ sec. A turbid water with a high germ content must first be clarified, before it can be successfully sterilized with ultraviolet light. II. *Ibid.*, 68–91.—In the Westinghouse sterilizer, the Hg vapor lamp is in the top of a cylindrical tank just above the water. Some of the advantages claimed for this instrument over the under-water burners are that the cooling of the lamp in the latter lessens the production of ultraviolet rays, and that the salts and organic substances in the water being deposited on the quartz plates of the under-water burner interfere with the action of the light, more and more, with its use. The lamp requires $3^1/_2$ to 4 amp. at 110 v.; capacity is 600 l. of steril water per hr. Tests of a clear water, with a germ content of 300 show complete sterilization in 15 sec. exposure, even when enrichment samples of 200 cc. were made. With *B. prodigiosus* as the test bacteria, making the germ content of the raw water 250,000 per cc., a series of 8 tests, made at 5 min. intervals, shows an av. of 15 bacteria per cc., after 15 sec. exposure. Similar expts. with *B. coli*, "light vibrio," *B. violaceus* and spore bacteria which resist streaming steam for 1/2 hr., where the germ content of the raw water was 1500 or less, gave practically steril water in 200 cc. samples. CHAS. F. BRISCOE.

The Determination of Organic Substances in Sulfur Waters. M. DITTRICH. *Z. anal. Chem.*, 50, 697–700.—The usual method of detn. of organic matter by Kubel's hot acid method gives too high results in the case of waters containing H_2S, even when a correction is made for the $KMnO_4$ used in titrating the sample in the cold. More

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correct results are obtained by first pptg. the H_2S in the freshly collected sample by $CdSO_4$. A. G. WOODMAN.

Artificial Ground Water as a Water Supply. FR. HECHT. *Des. Wasser*, 14, 494; *Wasser u. Abwasser*, 4, 303–4.—Expts. were made by the water-works administration of Frankfort a/M to increase the ground-water supply by pumping water of the river Main onto large infiltration basins conveniently located. Such a plan has been successfully operated since 1875 by the Zwönitz water-works at Chemnitz.
ARTHUR LEDERER.

Incrustations of Boilers and the Remedies Proposed to Use for them. F. CALLIGE. *Bull. soc. ind. Rouen*, 39, 224–31.—The use of compds. specially prepared to treat each particular type of water is recommended. A knowledge of the exact comp. of the water is essential and analysis of the scale desirable. The objection to the use of water softeners and mechanical purifiers is the close supervision necessary and cost. Indiscriminate adding of starch, tannin, soda ash, etc., are insufficient to totally prevent incrustations. A table showing the analyses of certain waters together with comp. of incrustations produced by them is given. W. F. LANGELIER.

The Solubility of Ozone in Water. ED. MOUFANG. *Wochschr. Brau.*, 28, 434–6.—(1) The solubility of O_3 in water is largely proportional to temp. and pressure and conditioned by the chem. constitution of the water. (2) In general, an O_3 conc. of 1.5–10 mg. per l. of water between temps. of 2°–28° may be considered as the solubility coeff. (3) Small addition of acid increases the solubility to some extent and renders the O_3-water more stable. (4) Alkali, present as hydroxide or carbonate, acts in the opposit manner, while the neutral salts increase the solubility of the O_3 in water depending upon the degree of their dissociation. C. A. NOWAK.

Study of the Medicinal Mineral Waters of Valdelazura (Plasencia). José G. PEREIRA AND JULIO C. SÁNCHEZ ANGOSO. Salamanca. *Rev. real acad. cien.*, 8, 771–84, 996–1017; 9, 167–84.—The authors have made a very complete exam. of these waters and, in addition to the usual chem. analysis and bacteriological exam., have detd. the radioactivity, cryoscopic (the calc. mol. wt. shows the predominance of elements of small at. wt.) and ebullioscopic measurements, cond., osmotic pressure, degree of ionization, catalytic activity (measured by the activity of the water toward H_2O_2 and $KMnO_4$ in acid and in alk. soln.), hydrolyzing power (inverting action on saccharose) and the relations between the urinary constituents (7 ratios were detd. from analysis of the urin of a human subject consuming these waters). The water is of a diuretic nature (as indicated also by the ratio between its Cl^- and SO_4^{--}, when expressed in g. mols.) and also produced a marked increase in the so-called coeff. of organic oxidation. H. S. PAINE.

The Action of Bleaching Powder in Water Purification. EDWARD BARTOW AND GEORGE A. VAN BRUNT. Univ. of Ill. State Water Survey, *Bull.* 8, 51–8.—The work was done on U. of Ill. water, raw and filtered Miss. R. at Quincy, Ill., Lake Mich., at Lake Forest, Ill. and at Kankakee. The tests at the last 2 places were unsatisfactory, due to inadequacy of filters at Lake Forest and purity of water at Kankakee. At U. of Ill. results were good. At Kankakee, $94.00 for coagulation was saved in 57 days with 2 mill. gal. pumpage per day. At Quincy, bacterial removal varied from 87.7%, without bleaching powder, to 97.7%, using 0.035–0.25 g. per gal. (*C. A.*, 4, 1643).
D. K. FRENCH.

Analytical Control of Water Softening. EDWARD BARTOW AND ANDREW JACOBSON. Univ. of Ill. Water Survey, *Bull.* 8, 88–114.—A very thorough paper on the theory of water softening. The following simplified formulas for amt. of 90% lime and 95% soda are advocated. Lime = 0.0052 (4.16 Mg + alkali + 2.27 CO_2) lbs. per 1000 gal.

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90% CaO. Soda ash = 0.0093 (4.16 Mg + 2.5 Ca – alkali) lbs. per 1000 gal. 95% Na_2CO_3. The results of experimental tests are shown diagramatically. Many existing methods of analysis are given and an effort is made to outline those methods most in accord with rapid and accurate control work. D. K. F.

Sampling Factory Waste Waters. G. Fr. Meyer. *Chem. Ztg.*, 35, 997.—When these waters are sampled by the usual method of dipping into a bottle, too large a proportion is taken of any floating fat layer. An arrangement is described in which an open tin cylinder is sunk to half its depth in the water and then by means of a central rod the bottom of the cylinder is closed, giving a fair sample of the water.

A. G. Woodman.

The Question of Zinc Coating of Pipes. O. Kröhnke. *Gesundh. Ing.*, 34, 741–51.—The application of Zn coats for the protection of Fe pipes has a number of advantages which are based upon the electrochemical relations between Zn and Fe. The resistance of the Zn coat to external influences is dependent upon the thickness of the deposit of Zn and its adhesion to the metal underneath. The coating must be of a certain d. and expansibility, and must also be as pure as possible, particularly free from Pb. It must adhere to the Fe in an unbroken layer and 10–17 ounces per 10.75 sq. ft. surface should be used. The molten bath process is preferable to the elec. process because the coat is likely to be more evenly deposited and to adhere more closely to the Fe pipe. The loss of Zn in the electroplated pieces (kept in contact with running water for 8 mos.) was 3.11–19.16% and 7.79–9.58 in pieces from the molten bath process. Arthur Lederer.

Studies of the Relative Corrosion of Metal Pipes of Waters, Especially before and after Purification. H. W. Clark and S. DeM. Gage. Report of the Mass. Board of Health, *Separate*, 3–24; *Eng. Record*, 64, 504.—Cold water tests were made in 1 in. pipe 30 ft. long., temp. range, 50–70° F.; 7 days limit of test. Hot water tests at 125–35° F. were made in pipes 6 ft. long with similar fittings. Tests lasted 3 days. Mechanically filtered water was always much more corrosive than the original supply; water from slow sand filter usually slightly more corrosive; a pond supply, showing virtually the same alkalinity, very corrosive; also a driven well supply. Treatment with lime decreased slightly the corrosive action, while soda had little effect. Heat, both in Fe and galv. Fe pipes, greatly increased corrosive action. Alkalinity with lime increased corrosion with cold and had reverse action with hot water. In every case, galv. Fe pipes showed less action than Fe pipes, defective coating or thread cutting no doubt being to blame. Dissolved O greatly assisted corrosion, the O in the water being greatly diminished after the test. The removal of small amts. of protective organic matter was held responsible for increased corrosion of filtered waters. A complete summary of the literature and a bibliography are given. D. K. French.

Lincoln Water Works. Anon. *Engineering*, 92, 431. J. J. M.

The Use of Coagulants with Slow Sand Filtration (Pittsburg). George A. Johnson. *Eng. Record*, 64, 476.—Three lbs. of $Ca(OCl)_2$ per mil. gals. water is desirable. This has been applied dry in a gate house. As a preliminary treatment for slow sand filters, coagulation is feasible but expensive. Twenty-four hrs. settling is required after the introduction of the coagulant to prevent the ppt. from passing to the filter. To correct the variations in Fe and acid conditions of the river, particularly that due to the turbidity of the water, preliminary contact baffles of crushed stone 8 ft. deep were recommended. Langdon Pearse.

The Water Works of Hamburg, Germany. Annual Report for 1909. *Wasser u. Abwasser*, 4, 360–1.—Alum has been added as a clarifying agent to the water previous to filtration on account of the increased turbidity of the Elbe water. The alum had

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a very good effect in reducing the turbidity and the bacteria. The rate of filtration, however, would not increase because of the unavoidable presence of $Al(OH)_3$ particles. **Annual Report for 1910.** *Ibid.*, 361–2.—The filters for the removal of Fe from the ground-water supply have an hourly rate of 71.4 gals. per sq. ft. filter area.

ARTHUR LEDERER.

Operation of Providence Filters. OTIS F. CLAPP. *Eng. Record*, 64, 516.—Color reduced 31.5% and bacteria 98.3%. Cost of pumping, $3.20, of filtering, $1.78 per mil. gals. H. V. MAIN.

The Dissolved Oxygen Contents of the Waters of Würzburg and Vicinity. H. K. LANG. *Proc. Phys.-Med. Soc. Würzburg, N. F.*, 40; *Wasser u. Abwasser*, 4, 377.

ARTHUR LEDERER.

The Municipal Water Works of Brieg, Silesia, Germany. Annual Report, 1909. *Wasser u. Abwasser*, 4, 250.—The fluctuations of ground-water, as daily recorded, proved to be entirely independent of the amt. of pptn. This tends to prove that the water does not originate from 1 ground-water basin, but rather from a large ground-water stream, which probably comes from the mountains. A filter area covering 3,875 sq. ft. serves for the removal of Fe from the water. A. L.

The Water Works of Helsingfors. Annual Report for 1910. *Wasser u. Abwasser*, 4, 362–4.—The water from the river is purified in rapid filters of the Jewell type. Alum, soda and lime are used as coagulants. The purification process is controlled by measuring the elec. cond. of the water and by titration. The improvement of the final effluent is shown by its physical as well as its chem. character. The inorganic salts are doubled. The O consumed in the river water is reduced from 84 pts. per mil. to 19 in the final effluent. A. L.

Chemical and Physical Investigations of Storage Reservoirs, Particularly of the Eschbach Reservoir at Remscheid. THIESING. *Mitt. kgl. Prüfungsamt. f. Wasserversorgung.*, 1911, 1–267.—The storage period in the reservoirs (fed by small brooks) is 30–100 days, depending upon the surface level. The water showed a green tinge which changed to yellow when the sol. Fe contents increased. Now and then an odor of saw-wrack, fishes, aromatic substances, or H_2S was noticeable. The quality of the surface water did not differ very much from that of the bottom layers. The insol. matter settled as sludge which, however, showed only little tendency to putrefaction. The reservoir water as a whole was purer than the water of the small feeders. The water was exceptionally rich in free gases, such as O and CO_2. The latter acted as a solvent upon the mud and the mineral matter at the bottom of the reservoir. The stored water represents a very good surface water. In new reservoirs (not freed from putrescible material) it is 2–3 yrs. before the organic matter becomes stable. "Rieselwiesen" are used to remove the residual suspended matter and sol. Fe and any bad taste or odor from the basin water. Influence of a questionable character should be excluded and the coarsest suspended matter should be kept back at the entrance of the brooks into the reservoirs. Sedimentation of the fine suspended matter in the reservoir should be encouraged, for it means self-purification. It is questionable whether it is wise to remove the humus layer at the time the reservoir is prepared and the vegetation removed. Fish life is to some extent desirable, inasmuch as it influences favorably the quality of the water. The quality of the water is greatly improved by passing it over "Rieselfelder." A. L.

The Biology of Storage Reservoirs, Particularly of the Eschbach Reservoir at Remscheid. KOLKWITZ. *Mitt. kgl. Prüfungsamt. f. Wasserversorgung.*, 1911, 268–411.—Properly operated reservoirs furnish a very good water supply, regardless of their size. The normal presence of the organisms in the reservoir has a great deal to do

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with the quality of the supply. The control of the quality can be a bacteriological or a planktological one, or a combination of both. A large number of splendid colored illustrations, showing dried and fresh mud from the bottom of reservoirs and various species of plankton, accompany the report. A large number of tables gives the groups and individual species of plants and normal organisms found in each of the waters of the basins examined. A. L.

A Water Works Laboratory. EDWARD BARTOW. Univ. of Ill., *Bull.*; State Water Survey, *Bull.* 8, 136–9.—A very complete list of app. and chemicals, for chem. and bacteriological control labs. D. K. FRENCH.

Composition and Treatment of Lake Michigan Water. EDWARD BARTOW AND L. I. BIRDSALL. Univ. of Ill. State Water Survey, *Bull.* 8, 30–50.—The comp. of Lake Michigan water is shown in tabular form (av. of 10 independent analyses). The turbidity and alkalinity were carefully followed during the yr. The water should be purified. Mech. filters most satisfactory and economical. Lime, alum, lime and alum (in varying amts.), F_2SO_4 and lime, NaOH and Na_2CO_3 were used in several experimental treatments. 1.5 g. alum and 2 g. lime per gal. gave the best results, the water being clarified and partially softened; hardness was reduced from 125 to 75 pts. per mil. (cost $3.32 per mil. gal. H_2O). Smaller quantities of alum do not form satisfactory flocs for filtration. Iron gives less expensive treatment, but the residual color is undesirable. NaOH and Na_2CO_3 increase the cost without material advantage. D. K. FRENCH.

Nitrite Destruction Test for a Polluted Water. EDWARD BARTOW AND FRANK BACHMANN. Univ. of Ill. State Water Survey Series, *Bull.* 8, 115–25.—This test is proposed in an effort to reduce the time of a chem. and bacteriological analysis to det. the purity of a water. *B. coli* or other intestinal bacteria are very active in destroying nitrites in the nitrite broth (*C. A.*, 4, 2695). The reaction of the media is considered in an effort to get nitrite fermentation in 24 hrs. A reaction of +2% (acid) was most suitable and gave satisfactory results. Peptone increases while gelatin inhibits the nitrite-destroying power of bacteria. The medium recommended was 6 g. beef extract per l., 2% peptone, 0.2% gelatin, 0.005% $NaNO_3$, and a final reaction of +2% (acid). This showed nitrite destruction in 24 hrs. for intestinal forms only, though all types were used in the tests. D. K. FRENCH.

Cause and Sequels of the Water-borne Typhoid Outbreak at Mankato, Minn., 1908. ANON. *Eng. News*, 66, 406–8.—The cause was the backing up of sewage and pollution of two greatly neglected municipal wells. The repairs to prevent future typhoid outbreaks are described in detail. D. K. FRENCH.

Chemical Precipitation of Sewage at Providence, R. I. *Eng. Record*, 64, 477.—25.07 mil. gals. of sludge were produced during the year, of which 20.54 mil. gals. were pressed into 30,010 tons of cake. 485.5 lb. lime were used per mil. gals. The cost was $3.11 per mil. gals. for chem. pptn. and $4.06 for sludge disposal.

LANGDON PEARSE.

Sewage Treatment in Manufacturing Districts. K. IMHOFF. *Tech. Gemeindebl.*, 14, 39–40; *Wasser u. Abwasser*, 4, 275–6.—The principal rules for sewage treatment are: (1) Avoid septic action; (2) aerated and well flushed sewers; (3) screens are insufficient; (4) settling tanks suffice for the sedimentation of a more mineral sewage; (5) for an organic sludge the settling period should be at least 2 hrs. The sludge should be regularly removed and the settling followed by biologic treatment. The operation of plants in manuf. districts of England is unsatisfactory.

ARTHUR LEDERER.

The Biologic Sewage Purification at Manchester, England. *Wasser u. Abwasser*, 4, 273–5.—(Annual report for yr. ending Mar. 30, 1910). Manchester owns 2 purifica-

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tion plants. At Withington the sewage is pumped into 2 grit chambers, 2 settling basins, 20 biologic filters, and 4 storm water filters. The screenings are burned. At Davyhulme the sewage first passes a self-cleaning screen, then a grit chamber, 12 open septic tanks, and finally biologic filters. Storm water filters are provided for in addition. The filling material is slag. The rate on the av. is 5 gals. per cu. ft. of filling material. The sludge from the septic tanks amounts to 20.8 lbs. per 1000 gals. of sewage, and contains about 87% of moisture. Cost of operating and renewal of filters costs $60,000 per yr.; sludge removal, $42,000. ARTHUR LEDERER.

Notes on Collecting the Sewage of New York City at a Central Point. Progress Report, Metropolitan Sewage Commission. *Eng. Record*, 64, 470–2; *Mun. J.*, 31, 531.—It is desirable to subdivide the territory into districts agreeing with the principal natural drainage areas. LANGDON PEARSE.

Biologic Sewage Treatment in Indo-China. G. LAMBERT. *Tech. Sanitaire*, 6, 25–32; *Wasser u. Abwasser*, 4, 270–3.—The plant at Hanoi consists of a screen grit chamber, a septic tank, and a slag filter. The sludge accumulating on the bottom of the septic tank can be let into a sludge tank. The slag used for the filter is graded, the bottom layer having a diam. of 2–3 inches, and the surface layer of $^1/_2$–1 in. The effluents are clean, odorless and non-putrescible. The O consumed of the roughly filtered sewage is 28–40 pts. per mil., of the final effluent 2–3.4. ARTHUR LEDERER.

Suggested Disposal of Drainage at Tolono. EDWARD BARTOW. Univ. of Ill. State Water Survey, *Bull.* 8, 140-5.—The question of turning surface, industrial or cellar drainage into a water-bearing strata by means of a well is heartily condemned. D. K. FRENCH.

A Method of Measuring the Pollution of Confined Air. H. HENRIET AND M. BOUTSSY. *Compt. rend.*, 152, 1180–1.—5 cc. H_2O, condensed from the air under exam., are boiled 5 min. with 10 cc. of a soln. containing 0.316 g. of $KMnO_4$ and 0.425 g. of CrO_3 per l. After cooling, 10 cc. of a soln. of $(NH_4)_2Fe_2(SO_4)_3$, (10 g. per l.) and 10 cc. of H_2SO_4 are added and the soln. titrated with 0.002 *N* $KMnO_4$. The results are expressed in mg. of O per 100 cu. m. of air. The moisture and temp. of the air is noted and its vol. calc. from the wt. of condensed vapor. Results range from 1 mg. in atmospheric air to 21 mg. in workrooms. A. G. WOODMAN.

The Technic of Testing Rooms Disinfected with Formaldehyde. HÜNE. *Desinfektion*, 4, 1–16; through *Chem. Zentr.*, 1911, I, 1072.—Chemical reagents are less suited for the control of disinfection by CH_2O than bacterial tests. The suitability of a test bacterium for this purpose should be detd. by tests with a CH_2O soln. A single bacterium, Hoffmann's bacillus, for example, is sufficient. After the disinfection the test threads are placed in physiological NaCl soln., 1 : 50, and then in bouillon. A. G. WOODMAN.

Disinfection Experiments with "Izal" According to the Modified Method of Rideal-Walker. ELSE KRÜGER. *Desinfektion*, 3, 456–64; through *Chem. Zentr.*, 1910, II, 1151. A. G. W.

Arrangement of a Hood (SPECTATOR). 1. Removing Oil from Condensed Steam (BREDA). 4.

U. S., 1,005,493, Oct. 10. E. ZAHM, Buffalo, N. Y. **Apparatus for sterilizing water.**

U. S., 1,006,070, Oct. 17. G. W. DURBROW, Los Angeles, Cal. **Extracting micro-organisms and solids from water** by bringing them into contact with a sticky substance held by fibrous material, *e. g.*, cotton, gum copal and paraffin.

U. S., 1,006,736, Oct. 24. C. ELLIS, Montclair, N. J. **Solid composition for**

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use as an insectifuge, etc., comprizing soap and at least an equal amt. of an essential oil, *e. g.*, oil of cedar wood.

U. S., 1,007,176, Oct. 31. K. W. BARTLETT, Madison, Wisc. **Water-softening apparatus.**

U. S., 1,007,647, Oct. 31. C. R. DARNALL, Washington, D. C. **Purifying water or sewage by introducing minute quantities of dry Cl into it.**

15. SOILS AND FERTILIZERS.

F. P. VEITCH.

Oskar Kellner. J. KÖNIG. *Chem. Ztg.*, **35**, 1157–8.—Obituary. E. J. C.

Papers on Soils and Soil Investigations. *Verhandl. Internat. Agrogeol. Konf. Stockholm*, **2**, 117–24, 149–59, 276–8, 284–9, 290–8, 329–30.—The following papers were read at the Sec. Intern. Agrogeol. Congr. at Stockholm. The principles of the circulation of water in cultivated soils and their application (R. d'Andrimont); the relation of forms and movements of soil water to plant growth is discussed. The movements of nitrates in clay soils (S. Johansson); the relation between amt. and movement of soil water, and distribution of nitrates is discussed. Types of soils and their importance (S. de Miklaszewski); the predominant factor in the formation of a soil dets. its type; hence special methods of investigation are required with each soil examd. The classification of mineral soils according to external characteristics (A. Atterberg); studies on firmness and plasticity of soils are reported. Agrogeological mapping (K. O. Björlykke). Red soils (G. Murgoci); red soils of Asia Minor are believed to be of the same origin as those of southern Europe. WM. P. GARRETY.

The Volumetric Constitution of Soils. *Rev. sci.*, **49**, 150.—Soils containing like proportion of plant nutrient vary in vol., and it is therefore important to have some method of expressing results of chem. analysis on the basis of vol. as well as of wt.
WM. P. GARRETY.

The Value of Pyritic Moor Soils as a Foundation for Drainage Structures. G. FENDLER AND L. FRANK. *Gsndhts. Ingen.*, **33**, 877–8.—Injury to drainage structures was believed to result from free H_2SO_4 derived from moor soil containing pyrites. Analysis failed to confirm this belief, and showed sufficient amt. of carbonate to preclude the possibility of free H_2SO_4. WM. P. GARRETY.

Soil Observations in Istria: Red Soils (Terra Rossa). WILHELM GRAF ZU LEININGEN. *Naturw. Z. Forst. u. Landw.*, **9**, 65–89.—Red soils are derived from the residue of limestone rocks, and to some extent from flysch (sandstone). Ca and Mg are washed away leaving Al and Fe compds. Analysis of a typical sample gave H_2O and organic matter 11.77%, SiO_2 47.79%, Fe_2O_3 32.24%, Al_2O_3 3.15%, Mn_2O 1.35%, CaO 0.68%, MgO 1.37%, K_2CO_3 1.15%, Na_2CO_3 1.56%, P_2O_5 0.24%. Being deficient in Ca, such soils are improved by liming. WM. P. GARRETY.

Some Results of a Flying Soil Survey. B. C. ASTON. *J. New Zeal. Dept. Agr.*, **2**, 10–7.—Results of a survey of subantarctic soils of New Zealand are summarized. High N content, and close relation of type of soil and character of vegetation are noted.
WM. P. GARRETY.

The Escape of Ammonia from Manure during and after Hauling to the Field. P. LEICHTI AND E. RITTER. *Landw. Jahrb. Schwiez*, **24**, 481–525.—The loss of NH_3 in hauling is insignificant in comparison with that lost after applying. As much as $^1/_2$ was lost when applied on snow, the loss being greatest at temps. below 0°.
WM. P. GARRETY.

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The Importance of Peat for the Manufacture of Nitrogenous Fertilizers. R. SCHORR. *J. Am. Peat Soc.*, 3, 226–32.—Inadequacy of the present sources of N fertilizers is noted, and the desirability of investigating the possibilities of peat as a supplementary source is discussed. Brief descriptions and valuations of the processes employed in extraction of N compds. from peat are given. WM. P. GARRETY.

Problems in Peat Filler Production. J. N. HOFF. *J. Am. Peat. Soc.*, 3, 192–201.—15000–20000 tons are produced annually in the United States by 4 or 5 plants. In spite of low availability of N, H. considers it an ideal filler. WM. P. GARRETY.

Nitrate of Soda in a Texas County. W. B. PHILLIPS. *Manfrs. Rec.*, 58, 53.—A deposit discovered about 45 miles south of Valentine, Texas, gave on analysis 5–71% $NaNO_3$. WM. P. GARRETY.

The Fixation of the Nitrogen of the Air. BACHMANN. *Naturw. Wochschr.*, 26, 65–9.—Various processes are described, and the economic importance discussed. W. P. G.

The Knowledge of Lime Nitrogen. N. CARO. *Z. angew. Chem.*, 23, 2405–17; through *Chem. Ztg.*, 35, 32.—Investigations on the following subjects are summarized: Ag salts of cyanamide and dicyandiamide; quant. sepn. and detn. of cyanamide and dicyandiamide; detn. of urea in lime N; detn. of cyanide in presence of cyanamide and dicyandiamide; action of cyanide on carbide; action of CO_2 on lime N; action of N on carbide and alumina; prep. of pure cyanamide from its salts; action of N on a mixt. of barytes and lime; influence of added substances on the carbide-forming mixt. WM. P. GARRETY.

Bacteriological Methods for the Estimation of Soil Acidity. J. G. LIPMAN. *Science*, 33, 971–3; cf. *C. A.*, 5, 3313.—A method based upon bacteriological reactions is suggested for quant. estn. of soil acidity, using either ammonifying, N-fixing, or nitrifying organisms. "The amt. of acid present in cultivated soils may be detd. quite accurately by comparing bouillon of varying reactions with equiv. quantities of neutral bouillon of varying amts. of soil." WM. P. GARRETY.

Investigations on the Chemical and Mechanical Composition of Pine Forest Soils and Analyses of Ash of Pine Trees. I. VITYN. *Russ. J. Expt. Landw.*, 12, 171–203.—P_2O_5, Ca, and K, are sol. in greater amts. in HCl in podzol soils underlain with clay, than for soils over sand strata. All soils over sand strata were found alike in P_2O_5, Ca, and K content. Marshiness of soil reduces Fe_2O_3 content in the upper humus layer of soil. More ash was found in marsh soil forests than in podzol soils. The heart wood contained more ash than the sapwood, which may be ascribed to the fact that the trees were only about 70 yrs. old. WM. P. GARRETY.

The Problem of "Bare Patches." W. A. HARGREAVES. *J. Dept. Agr. So. Aust.*, 14, 836–46.—Sterlility is believed to be due to an excess of sol. salts, especially chlorides and sulfates. WM. P. GARRETY.

The Isolation of Creatinine from Soils. E. C. SHOREY. *Science*, 33, 340.—The method used in isolating creatinine from various soils is given in detail. W. P. G.

The Importance of Humus Substances. H. FISCHER. *Fühling's Landw. Ztg.*, 60, 73–83.—The present knowledge of the comp. and action of humus compds. and their relation to bacterial activity are reviewed. WM. P. GARRETY.

The New Science of the Soil. W. H. BEAL. *Sci. Am.*, 104, 168, 169, 186, 187.—Recent advances in chem., physical and bacteriological investigation of soils are reviewed. WM. P. GARRETY.

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Soils of New South Wales. III. H. I. JENSEN. *Agr. Gaz. N. S. Wales*, 22, 27–35.—Analyses and discussion of soils are given. W. P. G.

Composition of some Massachusetts Soils. J. B. LINDSEY. Mass. Agr. Expt. Sta. *Report*, 23 (1910), Pt. 1, 339–48.—This presents the results of a large no. of complete analyses not previously published of Mass. soils collected in 1892. C. A. BRAUTLECHT.

Recent Experience in the Application of Norway Saltpeter. KRÜGER. *Deut. Zuckerind.*, 36, 499.—Plot expts. with beets showed that Norway saltpeter ("air N") had the same effect as pure $Ca(NO_3)_2$ and a little better effect than Chile saltpeter. The statement has often been made that nitrites are harmful, and air saltpeter has been criticized because of its containing a small amt. of nitrites. Expts. with pure $Ca(NO_2)_2$ showed that it had as much value as $Ca(NO_3)_2$. W. L. BADGER.

Penetration of Fertilizers into the Soil. A. DEMOLON AND G. BROUET. Sta. Agron. Aisne, *Bull.* 1910, 73–85; cf. *C. A.*, 5, 1966.—NaCl has very low rate of diffusion even in sand, and clay has great absorbent power for it. $NaNO_3$ showed much lower rate of diffusion than expected. Strong soils lose little nitrates during plant growth. Slow rate of diffusion shows the desirability of thorough mixing of sol. fertilizers with soil to a considerable depth. WM. P. GARRETY.

Phonolite as a Fertilizer. M. POPP. *Mitt. Deut. Landw. Gesell.*, 26, 52–7.—Expts. continued over 2 yrs. show phonolite about $^1/_2$ as effective as K salts in after effects. W. P. G.

Preparation of Dicalcium Phosphate. P. PALMAER. *Teknisk Tidsskr.*, 40, 157; through *Chem. Ztg.*, 35, 43.—This describes the prep. of $Ca_2H_2(PO_4)_2$ by treating crude phosphate with acid obtained by electrolysis of $NaClO_3$ or $NaClO_4$, with regeneration of the electrolyte. The resultant P_2O_5 has a solubility of 35% in citrate soln. WM. P. GARRETY.

The After Effects of Phosphate. H. G. SÖDERBAUM. *Meddel. Centralanst. Försöksv. Jordbruksomradet*, 1911, 22; through *K. Landtbr. Akad. Handl. och Tidskr.*, 50, 218–36.—Insol. phosphates were found only about 70% as efficient as equal amts. of sol. P_2O_5 (superphosphate). When conditions were unfavorable, especially the lime factor, the increase was only 10%, or less. S. concludes that the after effects of insol. phosphates are too small to be of economic importance. WM. P. GARRETY.

Experiments with Bone Meal. D. N. PRYANISHNIKOV, *et al.* *Ann. Inst. Agron. Moscow*, 17, 142–76.—Bone meal is more sensitive to the conditions under which it is used than superphosphate or Thomas slag. $CaCO_3$ reduced its efficiency, which was increased by substitution of atmospheric N, obtained by leguminous plants, for nitrate N, and by addition of NH_4 salts. If used, it is better to apply nitrate N separately. WM. P. GARRETY.

Carbon Disulfide as Soil Renovator. C. J. J. VAN HALL. *Tevsmannia*, 22, 152–62.—A review. W. P. G.

Heavy Root Feeding and the Dung Heap. J. HENDRICK. *Trans. Highland and Agr. Soc. Scotland*, 5, *ser.*, 23, 32–9.—About 85% of N given to animals in heavy root feeding is lost in liquid manure, which is much greater than with linseed cake or other conc. nitrogenous feeding stuffs. WM. P. GARRETY.

Experiments with Different Nitrogenous Fertilizers for Spring Grains and Root Crops. F. HANSEN. *Tidsskr. Landbr. Planteavl.*, 17, 693–731.—Expts. show the following relative values: $NaNO_3$, 100; Norway saltpeter ($Ca(NO_3)_2$), 79 for roots, 88 for spring grains; $(NH_4)_2SO_4$, 71 and 96; Ca cyanamide, 42 and 74; liquid manure, 65 and 72; Ca cyanamide plowed under, 68. After effects appeared, especially with Ca cyanamide

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and $(NH_4)_2SO_4$, but were not marked. $NaNO_3$ gave best results when $^1/_2$ was plowed under and $^1/_2$ used as a top-dressing. The other mineral fertilizers gave best results when plowed under. WM. P. GARRETY.

After Effects of Phonolite as a Potash Fertilizer. S. RHODIN. *K. Landtbr. Akad. Handl. och Tidskr.*, 49, 691–5; cf. *C. A.*, 4, 2971; 5, 1487.—No increase of solubility was noted the second season, and results indicate that ground phonolite is not to be compared with Stassfurt salts in availability, effectiveness, and cheapness. WM. P. GARRETY.

A Study of the Composition, Toxicity, and Chemical and Biological Evolution of Crude Ammonia. A. DEMOLON AND G. BROUET. Sta. Agron. Aisne, *Bull.* 1910, 92–118.—Crude ammonia is a by-product of gas manuf., and is a mixt. of various forms of N. Ferrocyanides are most important, thiocyanates are sometimes present, and S, mostly in a free state, is always an important constituent. Crude ammonia varies in toxicity with the amt. of thiocyanates and is not affected by moisture and O of the air. Toxicity disappears slowly in moist air, more rapidly in contact with soil. Micro-organisms readily assimilate the N of the crude ammonia, the thiocyanates more slowly, and the ferrocyanides still more slowly. WM. P. GARRETY.

Action of an Addition of Alumina and Silicic Acid Gels to the Soil on the Assimilation of Phosphoric Acid by Plants. T. PFEIFFER AND E. BLANCK. *Mitt. landw. Inst. Breslau*, 6, 315–24.—Dry matter and P_2O_5 are reduced by Al_2O_3 and silicic acid gels. Addition of $CaCl_2$ and freezing had no effect. Heating reduced dry matter and probably P_2O_5 assimilation. P_2O_5 seems to enter into chem. combination, not into absorptive combination. WM. P. GARRETY.

Manganese Causing Bare Patches in Soil. *Agr. Gaz. N. S. Wales*, 22, 70.—Toxicity of soil due to 0.24% of Mn_2O_3 which had killed the grass was corrected by use of superphosphate. WM. P. GARRETY.

Manganese in Field Experiments. H. BARTMANN. *J. agr. prat.* (*n. ser.*), 20, 666, 667; cf. *C. A.*, 5, 1657.—Yields of potatoes and sugar beets were greatly increased by use of Mn salts, the greatest yield resulting from use of 176–352 lbs. to the acre. WM. P. GARRETY.

Bat and Bird Guanos in India. I. H. BURKILL. *Agr. Ledger*, 1911, (*Anim. Prod. Ser.*), No. 3, 1–9.—The guano deposits of India are discussed as to character, comp., extent, and exploitation. They are variable in comp., rich in P_2O_5, poor in K and N. They are too small in extent to be of much economic value. WM. P. G.

Report of Experiments with Nitrogenous Manure. T. MILBURN AND R. C. GAUT. County Council Lancaster, Ed. Com., Agr. Dept., *Farmers' Bull.* 20.—$(NH_4)_2SO_4$, $NaNO_3$, and com. calcium cyanimide and $Ca(NO_3)_2$ were found equally effective in production of crops of oats, mangel-wurzels, and potatoes. Calcium cyanamide was found difficult to apply because being light and dusty it may cause injury to young plants. $Ca(NO_3)_2$ tends to absorb moisture from the air and become sticky and difficult to apply. WM. P. GARRETY.

Results of Fertilizer Experiments with Potassium Silicate and Like Substances during 1910. WEIN. *Deut. landw. Presse*, 38, 291, 292.—This sort of fertilizer was found very effective. W. P. G.

Investigations on the Action of Ground Phonolite. W. KRÜGER, *et al. Mitt. deut. landw. Ges.*, 26, 111–5, 125–8, 146–8; *Mitt. Herzogl. Anhalt. Vers. Stat.*, 1911, No. 48.—Pot and field expts. with ground phonolite showed it less effective and more expensive than K salts. WM. P. GARRETY.

Fifty Years of the German Potash Industry. P. KRISCHE. *Chem. Ind.*, 34, 173–82.—The history and present status of the industry are reviewed. W. P. G.

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The Fertilizing Value of Certain Phosphatic Materials. A. GRÉGOIRE AND J. HENDRICK. *Ann. Gembloux*, 21, 166–83.—Two proprietary pptd. mineral phosphates were found less effective as a fertilizer than pure dicalcium phosphate. WM. P. G.

Molasses as a Fertilizer. G. N. MARTIN. *Intern. Sugar. J.*, 13, 153–5.—Expts. made by the author and by Boname show value as a fertilizer of 400–600 gals. of molasses per acre applied 1 or 2 weeks before planting cane. WM. P. GARRETY.

Fertilizing Materials. F. V. DARBISHIRE AND W. GOODWIN. *J. Southeast. Agr. Coll. Wye*, 1909, 201–7.—Analyses and valuations are given of K phosphate, tortoise-shell dust, and shavings, $(NH_4)_2SO_4$, bone manures, fish guano, shoddy, and sewage sludge. WM. P. GARRETY.

The Natural Plant Food Content and Fertilizer Requirements of Soils. F. LEDIEN. *Gartenflora*, 60, 25, 26, 94–106.—Recent investigations with reference to horticulture are reviewed. WM. P. GARRETY.

Debated Fertilizer Questions. SCHNEIDEWIND. *Z. angew. Chem.*, 23, 567, 568. —The questions briefly discussed are soil robbery, $NaNO_3$ *versus* $(NH_4)_2SO_4$, the most efficient forms of P_2O_5 and K, and the CaO–MgO ratio in soils. WM. P. GARRETY.

The Value of Peat Litter. J. J. TYLVAD. *Hedeselsk. Tidsskr.*, 1911, 74–83.—The method of manuf. and expts. with peat litter as an absorbent for liquid manure are described. Its use prevents loss of N. WM. P. GARRETY.

A New Ammonia Salt. SAATEN. *Dunger u. Futtermarkt*, 1911, 219–20; through *J. agr. prat.* (*n. ser.*), 21, 300, 301.—A cheap by-product of gas manuf., consisting mainly of $(NH_4)_2SO_3$ and $(NH_4)_2SO_4$, was found to give good results in comparison with $(NH_4)_2SO_4$ in expts. on wheat, rye, oats, barley, potatoes, beets, and grass. WM. P. GARRETY.

The Importance of Phonolite as a Potash Fertilizer. T. PFEIFFER, E. BLANCK AND M. FLÜGEL. *Mitt. landw. Inst. Breslau*, 6, 233–72.—Other investigations comparing phonolite with K salts are reviewed, and tests made with humus-silicic acid. The last named material was found valueless, and phonolite was found to have some value, but much less than K salts. WM. P. GARRETY.

Various Experiments with Raw Phosphates. D. N. PRIANISHNIKOV, *et al. Izg. Moskov. selsk. Khoz. Inst.*, 17, 1–141.—Methods of manuf. and results of tests are given. WM. P. GARRETY.

The Availability of Nitrogenous Materials as Measured by Ammonification. J. G. LIPMAN, P. E. BROWN AND I. L. OWEN. Soil Lab. N. Jersey Agr. Exp. Sta. *Centr. Bakt. Parasitenk. II Abt.*, 31, 49–85.—The authors tested various grades of dried blood, tankage, ground fish and substances of vegetable origin, and found that the ammonification and vegetation tests showed sufficient agreement to indicate that the ammonification test is useful in detg. the availability of organic N compds. in mixed fertilizers. H. J. CORPER.

The Rational Use of Lime. The Distribution, Composition and Cost of Lime. W. P. BROOKS, H. D. HASKINS AND J. F. MERRILL. Mass. Agr. Expt. Sta., *Bull.* 137.—A brief résumé of the possible effects of lime, how to det. what soils need liming, the relation of lime to crops, methods of application and quantity needed, the sources of lime in Mass., the present condition of the trade in agr. lime, and the chem. nature of the different forms of lime are given. Complete analyses of a large no. of samples of lime and the cost of CaO and MgO are included. C. A. BRAUTLECHT.

The Purchase and Home-mixing of Fertilizers. F. W. TAYLOR. N. H. Agr. Expt. Sta., *Circ.* 12.—Directions and formulas are given. C. A. B.

A Few Notes on Lime for Agricultural Purposes. B. E. CURRY. N. H. Agr.

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Expt. Sta., *Circ.* 13.—The nature of various com. forms of lime is briefly stated. The profitable use of lime on N. H. soils was considered questionable. C. A. B.

The Requirements in Mineral Matters of the Azotobacter. I. Also a Contribution to the Knowledge of Silicates. HERMANN KASERER. *Z. landw. Versuchsw.*, 14, 97–123.—*Azotobacter* and likewise many other soil bacteria do not thrive and especially do not actively bind N in the absence of considerable Fe and Al in sol. form. With pure dextrose and no organic acids to supply the carbonaceous matter in the nutrient medium, the Fe and Al, if supplied as the ordinary sol. inorganic salts, are pptd. too nearly completely by the phosphates. $K_4Fe(CN)_6$ may be used to supply sol. Fe but it is unstable. The phosphosilicates of Fe and Al, prepared by soln. of the freshly pptd. phosphates with K silicate, are well suited to supply the Fe and Al in these media. P. A. YODER.

The Amounts of Water and Plant Food Withdrawn from Soils through Drainage Water. GERLACH. Kaiser Wilhelms Inst. Landw., Bromberg. *Illust. landw. Ztg.*, 31, 755–6.—Several yrs. expts. with lisimeters show that there is about 3 times as much drainage during a fallow yr. as during the yrs. that crops are growing, with a corresponding greater loss of plant food. P. A. YODER.

Effect of Manganese Sulfate on the Growth of Plants. Relation between the Action of Iron and Manganese in the Soil. GUILIO MASONI. *Staz. sper. agrar. ital.*, 44, 85–112; through *Chem. Zentr.*, 1911, I, 35–6.—M. treated soil with definit amts. of $MnSO_4$, $FeSO_4$, and Na_2SO_4 and observed the growth of the seeds of lupines and wheat planted therein. The action of Mn does not depend primarily upon the Mn but rather upon the radical SO_4. The conclusion that the presence of $FeSO_4$ exerts a depressing effect upon the action of the $MnSO_4$ is not excluded. Fe can in no case be displaced by Mn. $MnSO_4$ in the soil changes from the water-sol. form into the form sol. only in acids (evidently into a carbonate by reaction with $CaCO_3$). P. A. YODER.

The Question of the Fertilization of (Fish-) Ponds. KUHNERT. Preetz, Holstein. *Wiener Landw. Ztg.*, 61, 829–32.—The addition of N fertilizers to fish-ponds is advantageous. P. A. YODER.

Leaf-louse Plague (WAGNER). 28.

U. S., Reissue 13,302, Oct. 31. L. R. COATES, Baltimore, Md. **Making a fertilizer**; see *C. A.*, 5, 141.

U. S., 1,006,927, Oct. 24. A. R. FRANK, Halensee, near Berlin, Ger. Assignor to Societa Generale per la Cianamide, Rome, Italy. **Reacting on carbides with nitrogen** by mixing with the carbide a carbonizable material to form channels or pores in the carbide mass, heating a relatively small part of the mass to reacting temp. and supplying N as the reaction proceeds, to maintain the temp. and continue the reaction throughout the mass.

Ger., 228,966, May 15, 1909. S. GERDES, JR., Bremen. **Strengthening plant growth and destroying injurious animal and vegetable parasites.** An extract of peat. in solns. of alkaline-reacting substances such as KOH, alkali carbonate, disodium phosphate, etc., is prepared. The compd. is stored some time to ferment in order that these peaty substances can be extracted with water. The extract is more or less evapd., and adheres firmly to the plants. Before its use, fertilizers, such as phosphates, N combinations, etc., are added to the extract. To render the product colloidal, water glass is admixed, and the plants are dusted.

Ger., 229,153, Feb. 27, 1910. Addition to 196,938. G. HÖVERMANN, Hamburg. **App. for decomposing phosphates.** The principal patent is modified in that the locking

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piece on the chamber-opening is capable of being turned up. This part, in closing the chamber-opening and partly projecting into the chamber, is revolubly arranged in the upper part of the chamber opening. The door can be raised in a horizontal position. In order to pack the door during the filling of the chamber, bearings for a cross-tree are arranged, the latter being provided with a spindle through which the cover can be pressed on tightly.

16. FERMENTED AND DISTILLED LIQUORS.

ROBERT WAHL.

The Brewing Industry in France. P. PETTIT. *Bull. soc. ind. Amiens*, **48**, 357–73.—An interesting, illustrated article. The statements as to the presence of As, strychnine, etc., in beer is ridiculous. Among the samples of foodstuffs suspected for adulterations in France the smallest numbers are beers. C. A. NOWAK.

Calcium Carbonate in Brewing Waters and its Influence on Brewhouse Processes. F. POTT. *Wochschr. Brau.*, **28**, 249–52.—Solid carbonate has little influence on wort acidity. A wort prepared from calcareous water was found to undergo no marked reduction of acidity by b. 10 mins. The acidity of worts produced from mashes with dist. H_2O in the presence of solid $CaCO_3$ was more than $^1/_2$ that of worts similarly produced with H_2O alone. Neither aroma nor time of saccharification were influenced. With bicarbonate in soln. in the mashing water the acidity of the wort was reduced, saccharification retarded and aroma affected. This action is attributed to the normal carbonate, produced on warming, which is alk. in reaction and during formation unites with plant acids. The higher the temp. of decomp. of the bicarbonate the more sol., more reactive towards acids and more injurious it becomes. $CaSO_4$ and similar salts of mineral acids facilitate the decomp. of the bicarbonate which then takes place at a lower temp. In testing water for brewing purposes P. recommends detg. the decomp. of the bicarbonate at temps. ranging from 10–100°. C. A. NOWAK.

The Determination of Traces of Alcohol in Fermenting Solutions. ALB. KLÖCKER. *Centr. Bakt. Parasitenk. II Abt.*, **31**, 108–11.—K. modifies the Pasteur drop reaction for the detn. of alc. in fermenting solns., and is able to det. the presence of alc. in 0.002 vol. %. He uses 5 cc. of the soln. to be tested in a vessel 180 mm. long and 24 mm. in diam., stoppered with a cork, containing a glass tube 80 cm. long and 3 mm. in diameter. The soln. is slowly warmed over a wire gauze by means of a gas flame and care taken that bumping does not occur. Small characteristic oil-like drops accumulate in the glass tubing, higher up or lower, depending upon the amt. of alc. present. By this method he found that certain roots absorb alc. and also that small amts. of alc. are formed in yeast water on standing, which ought always to be tested for. Other substances besides alc. may give this reaction, *i. e.*, acetone (only in large quantity, however). Aldehyde, paraldehyde and the volatil acids, such as AcOH do not give it. When necessary an CHI_3 control can be run. H. J. CORPER.

Solubility of Ozone in Water (MOUFANG). 14.

U. S., 1,006,154, Oct. 17. R. WAHL, Chicago, Ill. **In making beer free from objectionable albuminoids**, adding to the beer the lactic-acid-extracted substances of malt in soln. and containing the albuminoids dissolved and peptonized by the acid and the peptase of the malt (the soln. being free from objectionable proteins), so that the peptase of the soln. will digest the albuminoids of the beer.

U. S., 1,006,773, Oct. 24. H. G. MILLAR, New York, N. Y. **In making carbonated**

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beverages, placing sirup and liquid CO_2 in a closed vessel, placing H_2O in a second vessel and passing the sirup and CO_2 mixt. into the second vessel without contact with the air.

17. PHARMACEUTICAL CHEMISTRY.

VIRGIL COBLENTZ.

The Spirit Industries and Products therefrom in 1910. H. RÜDIGER. *Chem. Ind.*, 34, 548–56, 616–27. E. J. C.

Cultivation of Medicinal Plants in Korneuburg under State Control. E. SENFT. *Cas. Cesk. Lékárn.*, 30, 539–41.—S. presents with descriptions a list of plants under cultivation this year. P. J. HANZLIK.

Essence of Bupleurum fruticosum Linn. L. FRANCESCONI AND E. SERNAGIOTTO. Ist. chim. gen. r. univ. Cagliari. *Atti accad. Lincei*, 20, II, 230–3; cf. *C. A.*, 5, 3467.—The work reported in the earlier article has been taken up again, and the essence fractionated *in vacuo* into 17 portions; the physical consts., elementary analyses, free acid, free alc., sapon. no. before and after acetylation, and ester in each fraction are given; d. ranges from 0.8519 to 0.8558, α_D 53.37 to 19.15°, n 1.4782 to 1.4860. CHAS. A. ROUILLER.

Localization and Distribution of the Essence in Seseli bocconi and Crithmum maritimum Linn. L. FRANCESCONI AND E. SERNAGIOTTO. Ist. chim. gen. r. univ. Cagliari. *Atti accad. Lincei*, 20, II, 249–55.—Microchemical study (cf. *C. A.*, 5, 3610). C. A. R.

Essence of Santolina chamaecyparissus L. L. FRANCESCONI AND P. SCARAFIA. Ist. chim. gen. r. univ. Cagliari. *Atti accad. Lincei*, 20, II, 255–60; *Gazz. chim. ital.*, 41, II, 185–203.—The distribution of the essence in various parts of the plant is described (cf. preceding abstr.). The yield of essence obtained by extraction with hot H_2O or steam distillation under 1.5 atm. varies according to the seasons: Feb., 3.5; Apr., 2.25; June, 2.96; July, 11.50%. Before rectification with steam, it has a penetrating, irritating odor; after rectification, it is colorless and has more of a camphor odor. Under 15–20 mm. about $^2/_3$ b. 94–100° and $^1/_3$ b. 100–8°. The consts. for the crude essence and these 2 fractions, resp., are as follows: n_D 1.4722, ——, ——; d., 0.8704, 0.8586, 0.8767; α_D —11.66°, —12.23°, —7.57°; sapon. no., 11.78, 9.718, 13.65; sapon. no. after acetylation, 11.74, 9.71, 13.91. It is not acid. The comp. of the first fractions (more than 85% C and 12% H) indicates the presence of terpenes; that of the higher b. fractions (78–7% C and 11.5% H), hydroaromatic compds. containing O. Expts. shows the absence of phenols and the presence of ketones. The sapon. nos. show the presence of small amts. of ester accumulating in the higher b. fractions and the absence of free alcs. CHAS. A. ROUILLER.

Localization and Distribution of the Essence in Bupleurum fruticosum Linn. I. L. FRANCESCONI AND E. SERNAGIOTTO. *Gazz. chim. ital.*, 41, II, 129–37; cf. *C. A.*, 5, 3610. C. A. R.

Humulene from the Oil of Hop Flowers. ERNST DEUSSEN. Lab. angew. Chem., E. Beckmann, Leipzig. *J. prakt. Chem.*, 83, 483–9.—From the fractions of oil of hop blossoms, d_{18} 0.883, α 0° 20′, which b_8 114–6.5°, 116.5–22°, resp., and showed α —48′, 2° 47′, d_{19} 0.8955, 0.8976, n_{19} 1.4975, 1.4960, were prepared the nitrosate, nitrosochloride and nitrosite. The 2 former were identical with the corresponding derivs. of α-carophyllene, but the latter was inactive, m. 113° and depressed the m.

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p. of blue β-carophyllene nitrosite (m. 114°) about 17°. D. concludes that the "humulene" of the oil of hop blossoms is an inactive α-carophyllene. C. A. R.

Coagulum from Gelatin-Gum Sols. (TIEBACKX). 11.

U. S., 1,005,217, Oct. 10. F. HOFMANN and C. COUTELLE, Elberfeld, Ger. **Making divinyl** by completely alkylating tetramethylenediamine, converting the product thus obtained into the corresponding quaternary NH_4 base and finally decomposing the latter, *e. g.*, by treating with AgOH and warming.

U. S., 1,005,224, Oct. 10. B. L. JENSEN, Lake City, Colo. **Prairie-dog poison** containing NaCl 50, powdered resin 0.5, $BaCO_3$ 2 and powdered opium 0.25 part and the juice of 1 part of currants.

U. S., 1,005,456, Oct. 10. E. NUSSBAUM, Vienna, Austria-Hungary. **Obtaining acid albuminate** from albuminous substances, *e. g.*, waste products from manuf. of starch, by digesting the material with dil. acid, *e. g.*, H_3PO_4, with the addition of yeast and sugar soln., stirring the mass at intervals extending over many hrs. while undergoing fermentation, and then allowing the mass to undergo sedimentation while at rest.

U. S., 1,006,793, Oct. 24. F. RIETHOF, Teplitz-Thurn, Austria-Hungary. Assignor to Blumberg & Rindskopf, Zuckmantel, Austria-Hungary. **Making sodium aldehyde-sulfoxylates** by mixing together Zn dust, CH_2O, $NaHSO_3$ and H_2O and causing the mixt. to react under pressure in the presence of gases which prevent oxidation.

U. S., 1,006,854, Oct. 24. F. KUHN, Cassel, Ger. **Making steril catgut ligatures** by twisting the material within a disinfectant, *e. g.*, $HgCl_2$ soln., removing the excess of the latter, and drying the ligatures, all within the same receptacle.

U. S., 1,007,587, Oct. 31. F. S. MASON, New York, N. Y. **Compound of lactic acid with santalol,** having the formula $CH_3CHOHCOOC_{15}H_{25}$, a reddish brown liquid, sp. gr. 1.03–1.04, b. 250–260°$_{25}$, neutral, insol. in H_2O and sol. in organic solvents.

Brit., 27,046, Nov. 21, 1910. FARBEN. VORM. F. BAYER & Co., Elberfeld, Ger. **Mfg. thiazolesulfonic acids** by treating with thiosulfates the condensation products produced from aromatic aldehydes (benzylidene compds.) or benzyl haloids or their derivs. and sulfonic acids of aromatic amines of the naphthalene series, or treating with thiosulfates mixts. of the above-mentioned components capable of forming benzylidene or benzyl compds. of sulfonic acids of suitable aromatic amines.

Brit., 29,282, Dec. 16, 1910. M. SCHLAUGK, 5 Roon Strasse, Hanover, Ger. **Preserving aqueous solutions of hydrogen peroxide** by adding to them a small quantity of *p*-acetylaminophenol.

Brit., 29,559, Dec. 20, 1910. KALLE & Co., AKT.-GES. **Therapeutic preparations;** see *C. A.*, 5, 2698.

Ger., 228,951, May 19, 1909. CHEM. FABRIK HELFENBERG AKT.-GES. VORM. E. DIETRICH, Helfenberg, Saxony. Production of **preservable tablets of acids and alkali carbonates.** Mixts. of tartaric or citric acid with Na_2CO_3 or $NaHCO_3$ cannot be preserved if put up in tablets. This is remedied by adding to the tablets containing the acid and the alkali a dehydrating agent. Especially suited for this are anhydrous sulfates, chlorides such as NaCl and $MgCl_2$, an addition of 2–4% being sufficient.

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18. ACIDS, ALKALIES, SALTS AND SUNDRIES.

T. LYNTON BRIGGS.

Ethics and the Practice of Chemistry. G. AUCHY. *Chem. Eng.*, 14, 433–4. J. J. M.

Technical Education of the Chemist in the German Technical High Schools. E. BOLLMANN. *Chem. Ztg.*, 35, 1173–5. E. J. C.

Some Problems in Chemical Engineering Practice. F. W. FRERICHS. *J. Ind. Eng. Chem.*, 3, 856–60. E. J. C.

American Institute of Chemical Engineers. Report of Committee on Chemical Engineering Education. *J. Ind. Eng. Chem.*, 3, 863–6. E. J. C.

A Model Laboratory for the Testing of Materials. ANON. *Stahl u. Eisen*, 31, 873–80.—A description with 12 photos of the chem. lab. of Fried. Krupp Co. at Essen. E. J. WITZEMANN.

Concrete Tanks for Storing Ammonia. *Eng. Record*, 64, 481.—Two concrete NH_3 storage tanks (one holding 27,853 gal. and the other 17,091 gal.) are in use by a gas company at Ann Arbor, Mich., built at a cost of $1687.74 or 3.7 c. per gal. of storage. LANGDON PEARSE.

The Preparation of Perborates. F. H. FUHRMANN. *Chem. Ztg.*, 35, 1022–3, 1038–9.—Sodium perborate is formed according to the following reactions: $Na_2B_4O_7 + 2NaOH + 4H_2O_2 = 4NaBO_3 + 5H_2O$; $H_3BO_3 + NaOH + H_2O_2 = NaBO_3 + 3H_2O$; $NaBO_2 + H_2O_2 = NaBO_3 + H_2O$; $2H_3BO_3 + 2Na_2O_2 + H_2SO_4(2HCl) = 2NaBO_3 + Na_2SO_4(2NaCl) + 4H_2O$; $Na_2CO_4 + NaBO_2 = Na_2CO_3 + NaBO_3$; $Na_2O_2 + 2H_3BO_4 = NaBO_3 + NaBO_2 + 3H_2O$; $2H_3BO_3 + Na_2O_2 + H_2O_2 = 2NaBO_3 + 4H_2O$; $H_3BO_3 + NaO_2H = NaBO_3 + 2H_2O$; $NaHB_4O_7 + 4H_2O_2 + 3NaOH = 4NaBO_3 + 6H_2O$; $2NaHB_4O_7 + 5H_2O_2 + 3Na_2O_2 = 8NaBO_3 + 6H_2O$; $Na_2B_4O_7 + Na_2CO_3 + 4H_2O_2 = 4NaBO_3 + CO_2 + 4H_2O$; $Na_2B_4O_7 + Na_2O_2 + 3H_2O_2 = 4NaBO_3 + 3H_2O$. There are 3 general ways in which this reaction is carried out: (1) The borax or boric acid and alkali are dissolved in water, the soln. cooled below 20° and the Na_2O_2 or H_2O_2 or both added. At 0–5° the $NaBO_3$ crystallizes out. (2) 100 pts. of H_3BO_3 mixed with 120–140 pts. of cracked ice are treated with 40 pts. of Na_2O_2 when the whole becomes liquid and upon standing solidifies into a cryst. mass. (3) The ingredients are mixed and heated to 60–70°, at which temp. fusion takes place and the reaction occurs without loss of O; upon adding water to the melt it becomes cryst. An electrolytic method is also employed by which a soln. of $NaBO_2$, passing through a cell divided into 2 chambers by a porous diaphragm, is oxidized by means of a 1–3 amp. current at 5–10 v. Perborax ($Na_2B_4O_8.10H_2O$) is formed by treating borax or boric acid with Na_2O_2. By varying the amts. of boric acid, borax, Na_2O_2, and H_2O_2, mixts. of $NaBO_3$, $Na_2B_4O_7$ and perborax are obtained containing varying amts. of available O. Perborates of Mg, Ca, and Zn are obtained by treating a soln. containing boric acid and a sol. salt of these metals with Na_2O_2 and H_2O_2, the reaction being: $2H_3BO_3 + MgCl_2 + H_2O_2 + Na_2O_2 = Mg(BO_3)_2 + 2NaCl + 4H_2O$. No definit perborate of Al has been obtained but by treating a soln. of Na_2AlO_3 with H_3BO_3 and H_2O_2 the compd. $Al_2Na_2B_2O_9.5H_2O$ is obtained. $NaBO_3$ in a fine state of division is very unstable so the production of large crystals is always sought and usually obtained by gradually cooling the mother liquor from 25–0°. Metallic impurities must be avoided to prevent catalytic decomp., tanks and app. being made of pitch pine or tinned metal. Crystals are drained in centrifugals and dried in a rapid current of air at temp. not exceeding 50°. $NaBO_3.4H_2O$ contains 10.39% available O. Dried *in vacuo* over P_2O_5 it becomes anhydrous and contains 19.51% avail. O. A. F. SEEKER.

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The Most Important Newest Acquisitions in the Domain of Atmospheric Nitrogen Manufacture. FRIEDRICH KLINKERFUES. *Wiener Landw. Ztg.*, 61, 856–7.—A discussion of the inventions of Serpeck for the prep. of the so-called "aluminum nitrogen" from Al_4C_3 and of Haber and Le Rossignol for the prep. of NH_3 directly from N and H. P. A. YODER.

Industrial Importance of Manganese and its Compounds. E. PRIWOSNIK. *Oesterr. Z. Berg-Hüttenw.*, 59, 582–7. E. J. C.

Magnesite. J. HÖRHAGER. St. Veit, Carinthia. *Stahl u. Eisen*, 31, 955–64; cf. *C. A.*, 5, 3027.—The occurrence, burning, furnaces for burning, prep. of bricks and linings, etc., are discussed in detail. E. J. WITZEMANN.

Grinding Wheels: their Preparation and Use. W. HERMINGHAUSEN. Hagen. *Stahl u. Eisen*, 31, 830–41.—An illustrated description giving much tabulated information about the recent developments in manuf., especially in Germany. E. J. W.

U. S., 1,005,761, Oct. 10. W. H. WRIGHT, St. Paul, Minn. **Ammonia concentrator**, comprizing a condenser having passageways in it through which the NH_3 distillate may be conducted, and passageways through which a cooling fluid may be conducted so that the vapors may be cooled and partly condensed by cooling, an absorber having passageways therein to pass the condensate from the condenser, and passageways for a cooling fluid near those for the condensate, the passages being constructed so that the vapors accompanying the condensate are caused to pass through the condensate to cool them and effect their absorption.

U. S., 1,006,195, Oct. 17. H. FRASCH, New York, N. Y. **Making salt** preliminarily in the form of coarse skeleton grains and then exposing it to showers of incrusting brine.

U. S., 1,006,196, Oct. 17. *Idem.* **Salt-making** by allowing supersatd. brine to ppt. salt while flowing over a salt growing bed in such vol. and at such speed that the fine grains of salt are kept from settling and carried along with the current.

U. S., 1,006,197, Oct. 17. *Idem.* **Removing incrustations of calcium sulfate from brine-heating surfaces** by bringing steam into contact with the surfaces incrusted by previous heating of brine and condensing the steam in contact with the surfaces until the condensed H_2O shall have dissolved and carried away the $CaSO_4$ by cooling the surface with brine on the opposit side and thus using the steam simultaneously to evaporate the brine, the steam and brine being applied alternately to the opposit sides of the heating walls.

U. S., 1,006,206, Oct. 17. F. HABER, Karlsruhe and R. LE ROSSIGNOL, Berlin, Ger. Assignors to Bad. Aniline & Soda Fabrik, Ludwigshafen a/R, Ger. **Making ammonia** by passing a mixt. containing H and N over Fe at a pressure of 150–250 atms. and sepg. the NH_3 produced in liquid form. A temp. of 650–700° is used.

U. S., 1,006,798, Oct. 24. F. L. SCHMIDT, Charlottenburg, Ger. **Making borates "containing active oxygen"** by heating Na_2O_2 with H_3BO_3 and borax to about 60° to melt the mixt. and allowing the mass to cool and solidify.

U. S., 1,006,823, Oct. 24. B. BLOCK, Erfurt, Ger. **Evaporating a solution from which salt is precipitated** by forcing it under pressure in a continuous cycle through a heater to an evaporator and thence through the latter back to the former, maintaining in the heater and the pipe connecting it with the evaporator such high pressure as to effect evapn. and pptn. in the evaporator, and retarding the velocity of the soln. during its passage through the pipe to permit the pptn. of impurities in the soln. and their collection at the place of pptn.

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U. S., 1,007,340, Oct. 31. H. C. COYLE and H. E. COYLE, Canton, Ohio. **Treating fabric for stereopticon screens** with a b.-hot soln. of glue, salt, alum, Na_2CO_3 and H_2O, slowly drying, applying more of the same soln. with the addition of sufficient Al-bronze to form a plastic mass and then slowly drying the screen.

U. S., 1,007,495, Oct. 31. O. SERPEK, Paris, France. Assignor to Soc. Gen. Nitrures, same place. **Making pure alumina** by b. Al nitride in a soln. of NaOH containing aluminate at about 20° Bé., sepg. the soln. from the insol. matter therein and pptg. the alumina by agitating the soln. in the presence of $Al(OH)_3$, sepg. the liquor from the ppt. and subjecting a fresh quantity of Al nitride to the liquor in a cyclic process.

Brit., 29,485, Dec. 19, 1910. A. BLUM. **Zinc oxide; see** *C. A.*, **5**, 2533.

Brit., 534, Jan. 9, 1911. H. GOLDSCHMIDT, 18 Salkenbergsweg, Essen a/Ruhr, Ger. Mfg. **pure ferroso-ferric oxide** by employing Fe or forge scales and calcining them.

Ger., 228,848, July 11, 1909. N. KANTORVNICZ, C. PAULUS and E. PIETROWSKY, Poren. **Rotating drum filter** through the apron of which the liquid contained in the substances to be filtered enters the interior of the drum and is drawn off by means of a pump through tubes suspended in the liquid, while the solid constituents adhere to the outer circumference of the drum and are removed from this through a scraper.

Ger., 228,875, Oct. 8, 1908. A. J. ARBUKLE and A. OSBORNE, Belgravia, Transvaal. **In a filtering apparatus** provided with a filtering drum, turning around a horizontal shaft, the chambers of which are alternately brought into connection with suction devices, and for the introduction of compressed air, all the conducting channels being passed through the hub of the cylinder.

Ger., 229,024, April 20, 1907. W. BLASS, Essen. **Air filter consisting of a revolvable** drum to which the filtering plates are exchangeably secured.

Ger., 229,066, Feb. 20, 1908. P. DEHNE, Halle a/S. **Continuously operating filter** with several filtering chambers revolvable about a middle column, into which chambers the liquid to be filtered can be fed under pressure through a common feeding tube, the chambers to be disconnected singly.

Ger., 229,106, Feb. 25, 1909. ALLGEMINE ELEKTRIZITÄTS GES., Berlin. **Removal of air from water,** the latter being led into a vacuum vessel at high speed and spread with deflection, into a thin sheet, so that the air contained in the water can be easily withdrawn and removed from further contact with the water.

Ger., 229,345, Nov. 16, 1907. G. HILDEBRAND, Spandau-Tiefwerver. App. for cooling **condensed gases** before their liquefaction. The pressure-reduction nozzle and the metallic bodies in connection therewith are surrounded by several turns of the end of the conduit for the compressed gas, so that the gas flowing out at reduced pressure contacts with these windings (cooling or chilling coil).

19. GLASS AND CERAMICS.

G. E. BARTON, A. V. BLEININGER.

The Sievert Window Glass Machine. ANON. *Glashütte*, **41**, 805–9, 833–6, 857–9, 885–8 (6 illus.).—A complete description of the drawing of the window glass cylinder by the Sievert machine. J. B. PATCH.

Clay and its Use in the Glass Industry. B. SCH. *Glasind.*, **22**, Nos. 39–41.—A detailed account of the process of pot making. J. B. P.

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Difficulties in Glass Decoration. A. R. *Glasind.*, **22**, Nos. 41–2.—Brief discussions of the manuf. of iridescent glass and gilding and the production of monograms by the sand blast. J. B. P.

The Various Processes for Decorating Enamelled Ware. ANON. *Glashütte*, **41**, 811–3, 839–40, 864–6. J. B. P.

Firing Troubles and their Causes. A. R. *Glasind.*, **22**, Nos. 37–40.—A list is given of a number of the difficulties encountered in the firing of ceramic ware, including glazing and decorating, and remedies are suggested. J. B. PATCH.

The Chemist in Clay Working. EDIT. *Brit. Clayworker*, **20**, 127–8.—A general discussion. C. H. KERR.

New Home Office Regulations. ANON. *Brit. Clayworker*, **20**, 137–45.—A draft is given by the regulations of the Home Office governing the manuf. and decoration of pottery, etc., especially as to the use of Pb compds. C. H. KERR.

The Control of Fusibility in Enamels. HOMER F. STALEY. Ohio State Univ. *Trans. Am. Ceram. Soc.*, **13**, 502–13.—Method of calc. fusibility or enamels from empirical physical factors for the "melted wts." of the several ingredients is discussed. The observations on which this system is based were made by cutting out of an enamel mixt. used in a com. way a considerable amt. of one material and putting in successively increased amts. of some other until an enamel of the same fusibllity was obtained. The following results are recorded: (*a*) Feldspar can replace flint in an enamel at a ratio to be detd. only by expt. with each feldspar; (*b*) the feldspar and fluorides must be considered as minerals and not as mixts. of oxides; (*c*) 1 lb. bone-ash in small amts. is equal in its hardening effect to $^2/_3$ lb. of flint; (*d*) one feldspar can be replaced by another in a ratio detd. only by expt.; (*e*) in enamels the following materials have the same fluxing power lb. per lb: K_2O and sol. Na_2O from sol. salts, BaO from $BaCO_3$, CaO in small amts. from $CaCO_3$, ZnO, PbO; (*f*) B_2O_3 and BaF_2 have the same fluxing power lb. per lb. One lb. of either is equal in fluxing power to $1^1/_4$ lbs. of any of the materials in (*e*).; (*g*) CaF_2 and Na_3AlF_6 have the same fluxing power, lb. per lb. One lb. of either is equal in fluxing power to $1^1/_2$ lbs. of any of the materials in (*e*). The fluxing power units, *A*, in an enamel mixt. are found by multiplying the lbs. of materials in (*e*) by 1, in (*b*) by $1^1/_4$, in (*g*) by $1^2/_3$, and adding the products obtained. The units of refractoriness, *B*, are found by multiplying the lbs. of flint by 1, those of bone-ash by $^2/_3$, lbs. of feldspar by *Y*, lbs. of sand by *Z*, and adding the products. *Y* or *Z* must be detd. experimentally for each feldspar or sand by finding what fraction of a lb. of flint 1 lb. of the given feldspar or flint equals in hardening effect. The fusibility of an enamel is shown by the "fusibility ratio" which is A/B. No scientific foundation for the method is offered, but it gives excellent results in practice. C. H. KERR.

The Calculation of Ceramic Mixtures. HOMER F. STALEY. Ohio State Univ. *Trans. Am. Ceram. Soc.*, **13**, 122–51.—The calculation of ceramic mixts. is discussed from 5 standpoints: (1) % amts. of raw materials, (2) empirical formulas, (3) "norms," (4) eutectics, (5) empirical physical factors. Method (1) is the simplest and is useful when the number of ingredients is few and the variations small. Method (2) is simple and graphic but it can "lay no claim to a scientific foundation;" it is "pseudo-chem.," neglecting important physical and mineralogical differences, since it is based upon ultimate analysis of the batch. Method (3) is an adaptation of Cross Iddings, *et al.* "Quan. Classification of Igneous Rocks," in which a norm is taken to be the mineral constitution of the rock magma as indicated by the comp. of the minerals which crystallize out when the rock magma solidifies; "the use of norms is restricted to a narrow field and must at all times be more or less hypothetical," but it is held to be the only rational method of attack in some cases. Method (4) is at present merely suggestive.

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Method (5) is based on empirical physical factors detd. separately for each class of ceramic mixts. and is offered as being capable of giving the exact control of mixts. in actual factory practice; for an example of the method, see preceding abstr.
C. H. KERR.

New Pottery Tunnel Oven with Floating Combustion Chambers. ANON. *Brit. Clayworker*, 20, 158–60.—Description is given of a tunnel kiln designed by Dressler and is in use at the Northolt Tile Works, Hayes End. A 30-day trial showed excellent results. The chief claims are: (1) Uniformly oxidizing conditions, (2) max. utilization of heat, (3) max. elasticity in rate of production and in heat treatment, (4) must lower cost of production (cf. *C. A.*, 5, 2539). C. H. KERR.

The Plasticity of Clay. MAX ROSENOW. Kgl. Techn. Hochschule. *Tonind. Ztg.*, 35, 1261.—The product of tensil strength, expansion and H_2O content—the "plasticity number"— was found to be const. for any given clay. To eliminate experimental errors it was detd. at several H_2O contents. Clays arranged according to the plasticity no. took the same rank as when arranged according to plasticity found in practice. Expts. on hygroscopicity, heat of wetting, and size of grain point to an enormously increased surface for plastic clays. This is commonly explained by the "colloidal envelop" but R. contends that the idea of a porous ultimate structure is sufficient. A real explanation of plasticity is still lacking. W. L. BADGER.

Sealing the Joints of Stoneware Pipes. JULIUS BARTH. *Tonind. Ztg.*, 35, 1245–7.—The failure of stoneware pipe lines is generally at the joints. The mortar or lute does not adhere to the smooth glazed surface, and a film of liquid may penetrate along the surface, ultimately destroying the joint. Stoneware pipes are now produced with roughened flanges, which are a great advantage over the smooth ones, but are not easily cleaned. The manuf. of a drain pipe with mortised grooves in the flanges has been accomplished, and makes an almost ideal joint. W. L. BADGER.

Investigations of Old Bricks and Mortar. ANON. *Tonind. Ztg.*, 35, 937.—A sample of brick and mortar from a bldg. (dated about 1400) in Constance. Brick: wt., about 5 kg.; size, 33 × 15.5 × 5 cm.; H_2O absorption, 20%; crushing strength, 260 kg./sq. cm. Mortar: H_2O, 2.0; insol., 57.8; Fe_2O_3 and Al_2O_3, 1.1; $CaSO_4$, 0.1; $CaSiO_3$, 1.4; $CaCO_3$, 35.8; $MgCO_3$, 0.8; $Ca(OH)_2$, 0.9%. W. L. BADGER.

Water Content of Sand-lime Brick. ANON. *Tonind. Ztg.*, 35, 1066.—Sand-lime brick, dried 5 days after hardening, contained 1.6–3.3% H_2O, according to the style of press in which they had been formed. W. L. BADGER.

Manufacture of Brick for Hot-blast Mains. ANON. *Tonind. Ztg.*, 35, 1026.—For the lining of hot-blast mains, very porous brick are coming into use. Brick are now made with a d. as low as 0.8. This is obtained by mixing sawdust, coal dust, peat, etc., with the clay. The clay must be very plastic, as well as refractory, to carry the filler and hold its shape after the filler is burned out. Such brick may be used to fill non-conducting spaces. They must be very carefully stored, as they take up moisture readily. W. L. BADGER.

Modern Plaster Technics. ANON. *Tonind. Ztg.*, 35, 969–71.—Describes various plasters for interior and exterior use, and methods of applying them, especially with compressed air. In choosing the lime, an analysis is not always sufficient. A fat lime is desirable; also one with hydraulic properties. Dolomitic limes are often hydraulic, but not necessarily so. Only practical tests will show whether a lime is suitable or not. W. L. BADGER.

China Clay (HICKLING). 8. Hydrothermal Silicates (BAUR). 6.

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U. S., 1,006,375, Oct. 17. P. FIREMAN, Washington, D. C. **Polishing glass, metal, etc.,** by means of a paste of Fe_3O_4 maintained sufficiently moist to prevent scratching the article polished.

Ger., 229,192, Sept. 26, 1908. SCHMIDT, KASSEKER & Co., Altwasser, Silesia. **Printing color for ceramics.** In a boiler linseed oil is heated with slightly more than the equal wt. of minium or other Pb compd. so long as it still absorbs such compd. The linseed oil becomes dark and resinifies on cooling to a mass like colophony. After satn. the other constituents required, such as animal fat, salad oil, lavender oil, anise oil, etc., are added as diluents. Thereupon the coloring bodies in question are added, such as metallic oxides, and the heating is continued with stirring until the product is suitable for printing. By reason of the Pb content, the color adheres strongly on being burnt in, without the addition of a flux.

20. CEMENT AND OTHER BUILDING MATERIALS.

C. N. WILEY.

Mechanical Shaker for Fineness Tests of Cement. A. D. GATES. *Eng. News*, 66, 466–7.—A contrivance designed and used by the author for making fineness tests on cement used at Panama. C. N. WILEY.

Some of the Properties of Oil-mixed Portland Cement Mortar and Concrete. LOGAN W. PAGE. *Eng. News*, 66, 440–2.—From an extensive series of expts., the author has arrived at the following conclusions: (1) Tensil strength of 1 : 3 oil-mixed mortar differs very little from that of plain mortar, and shows a substantial gain in strength at 28 days and 6 mos. over that of 7 days. (2) The times of initial and final set are delayed by the addition of oil, 10% of oil increasing the time of initial set by 90% and that of final set 60%. (3) Crushing strenght of mortar and concrete is decreased by addition of oil to mix, concrete with 10% oil having roughly 75% of strength of plain concrete at 28 days. At age of 1 year crushing strength of 1 : 3 mortar suffers but little with an addition of oil up to 10%. (4) Toughness or resistance to impact is affected but slightly by addition of oil up to 10%. (5) Stiffness of oil mixed concrete appears to differ but little from that of plain concrete. (6) Results for permanent deformation do not indicate that a law is followed by oil-mixed concrete. (7) Oil-mixed mortar and concrete contg. 10% oil have very little absorption, and under low pressures both are waterproof. (8) Oil-mixed mortar contg. 10% oil is absolutely water-tight under pressure as high as 40 lbs. per sq. in. Tests indicate that oil-mixed mortar is effective as a waterproofing agent when plastered or painted on either side of porous concrete. (9) Bond tests show inadvizability of using plain bar reinforcement with oil-concrete mixtures. With deformed bars the bond is not weakened seriously by the addition of oil in quantities up to 10%. The author advizes that he has taken out a patent on oil-mixed concrete, but any one may use the process without paying royalty. C. N. WILEY.

The Hydration and Hardening of Cements. P. ROHLAND. Stuttgart. *Z. Chem. Ind. Kolloide*, 9, 21–2.—An answer to Kiesermann (*C. A.*, 5, 1328) denying ever having suggested Portland cement as a Ca silicate, but always having recognized the importance of the colloidal condition of the substance, which, in hardening, is coagulated by the water and lime present. H. ISHAM.

The Effect of Humus, Sulfur Compounds and Electric Currents on Concrete, Particularly Reinforced Concrete. ROHLAND. *Der städt. Tiefbau*, 2, 105–6; *Wasser und Abwasser*, 4, 343.—The humus substances are not acids in the real sense. They are nonconductors of elec. Some react acid and some alk. Migrit proved to be a

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good protective for cement against these humus substances. Coatings which are formed by the evapn. of tar, asphalt, etc., are resistant against alkali, acid and alkali carbonate. Coatings which are formed by oxidation (such as linseed oil preps.) protect against steam and warm water. Const. elec. currents of low tension are injurious to Fe. S compds., acids, acid salts, free CO_2 and Mg compds. are likewise detrimental.

ARTHUR LEDERER.

Plaster of Paris Tiles and Boards as Fireproof Material for Dwellings. ANON. *Tonind. Ztg.*, 35, 1082.—As wood imbedded in plaster of Paris is rendered practically fireproof, this construction is recommended, esp. for garrets and roofs of dwellings.

W. L. BADGER.

U. S., 1,006,076, Oct. 17. K. L. F. FRIEDEMANN, Stockholm, Sweden. **Preserving wood** by first impregnating it with an aq. soln. of Ca cresate alone and then impregnating the outer layers with creosote oil.

U. S., 1,006,077, Oct. 17. *Idem.* **Preserving wood** by impregnating it with a soln. of an alkaline-earth phenol compd., *e. g.*, Ca cresate, and an oil, *e. g.*, creosote oil, in emulsion with the solution.

U. S., 1,006,713, Oct. 24. A. F. BARRY, Kansas City, Mo. **Preserving hardwood** by heating the air above the wood in a retort, applying suction at the bottom of the retort to create a vacuum and draw the heated air and moisture evaporated from the wood downwardly through the wood and cause sweating of the wood, increasing the suction and vacuum to remove the remaining moisture from the wood and then introducing hot preserving oil under pressure, and then admitting compressed air cooled by expansion to a low temp. to one end of the retort while allowing the unabsorbed oil to flow gradually from the bottom of the retort so that the preservative retained is viscidified in the sap channels by the cold compressed air.

U. S., 1,006,725, Oct. 24. E. CRAMER, Berlin, Ger. **Dry storable mortar or plaster** comprizing a mixt. of inert and mortar-forming material and sufficient MgO to absorb the moisture present in the mixt. and thereby prevent deterioration during storage and transportation.

U. S., 1,006,737, Oct. 24. C. ELLIS, Montclair, N. J. **Cement-coating composition** comprizing Pontianak rubber resin, a solvent for the resin, a cement-alkali-neutralizing compd., *e. g.*, tungstic acid, and a colloidal thickener, *e. g.*, Al tungstate and rubber.

U. S., 1,007,146, Oct. 31. E. J. SCHRODER, Chicago, Ill. **Roofing** made, *e. g.*, of felt, coated with adhesive and an overlying coating of flakes of crushed slate, overlapping each other and lying parallel with the adhesive coating so as to form a smooth outer surface.

U. S., 1,007,621, Oct. 31. T. A. WOMACK, Baton Rouge, La. **Paving material** composed of sawdust 34, tar 18, sharp sand 34, cement 5, crude S 5, pine rosin 8 and black strap molasses 9 parts.

Brit., 27,494, Nov. 25, 1910. D. HOWELLS, 24 Francis St., Dowlais, Co. of Glamorgan. **Manuf. of concrete or like articles** or materials, by the application and use of coal mine "rubbish," with lime, and with or without cement.

Brit., 24,256, Oct. 19, 1910. R. P. PICTET, 116 Uhlandstrasse, Wilmersdorf, Ger. Continuous production of **hydrogen and carbon from acetylene** or a mixt. of C_2H_2 with hydrocarbons in the form of a gas or vapor, by allowing the C_2H_2 or the mixt. to flow into an externally heated conduit or the like and be heated therein until dissociation takes place, and cooling that part of the conduit through which the constit-

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uents subsequently pass so as to absorb the excessive heat produced by such dissociation.

Brit., 1,688, Oct. 6, 1910. J. TANNE, Rozniatow, Galizia, Austria. **Separating solid hydrocarbons**, such as paraffin, ceresin, and ozocerite, **from naphtha residues and tars** by using a halogen substitution product of non-satd. hydrocarbons such as dichloro ethylene or acetylene dichloride and the like instead of CCl_4 as specified in 23,125, (1910).

21. FUELS, GAS AND COKE.

J. D. PENNOCK.

Analysis of Coke and Gas Coal. A. MEURICE. Bruxelles. *Ann. mines belg.*, 16, 553–77; through *Rass. min.*, 35, 163–5.—Directions for sampling and detg. humidity, ash, volatil matter and S. CHAS. A. ROUILLER.

The Combustion of Coal. WILLIAM KENT. Montclair, N. J. *Bull. Am. Inst. Mining Eng.*, 52, 367–8.—Discussion by Holmes and Kreisinger (*C. A.*, 4, 2995). It is pointed out that while the completeness of combustion of volatil matter may be a function of the length of time the mixt. with air is allowed to remain in the combustion space, under certain conditions in the Murphy stoker furnace, yet under other conditions such as perfect mixing of gas and air the time and space factors may be reduced almost to zero. The length of flame of coal gas depends on the completeness of mixing with the air supplied for combustion. That long combustion furnaces are not needed for the complete burning of soft coal when the furnaces make proper provision for securing a thorough mixt. of air and gas, is illustrated by citations from K.'s practical experience. When the mixt. is imperfect there are other factors of moment influencing the length of flame, *i. e.*, temperature of combustion chamber and % of moisture in coal. The length of flame in a boiler furnace is a measure of the imperfection of the furnace rather than of the quality of the coal. The proposed government tests to det. the length of flame proceeding from different kinds of coal will be of little value unless supplemented by other tests to show how the flame from any kind of coal may be shortened by making provision for the complete mixt. of the gases and air before they enter the combustion space. J. R. W.

Firing with Materials of Low Value. A. BEUSER. *Deut. Zuckerind.*, 36, 755–7.—A description with illustrations of the Frankel firing system. A. H. BRYAN.

Measurements of Gases. C. C. THOMAS. *J. Frank. Inst.*, 172, 411–60.—The elec. meter gives continuous results, even under severe com. conditions of operation, that compare most favorably with the best that can be obtained with other forms of direct-reading meters or by frequent readings on Pitot tubes and the use of tables and coeffs. derived from the most thorough calibrations; and it will give these results directly in any standard units desired, regardless of the pressure and temp. of the gas flowing through the meter. M. B. SMITH.

Hyperbolas of Smoke Constituents. E. LÁSZLÓ. *Chem. Ztg.*, 35, 994–6.—Given a fuel consisting of C and H, if the relation between these constituents be expressed by the formula C_mH_{lm}, l being the ratio between C and H atoms, the O theoretically necessary for complete combustion would be $2mO + lmO/2$, and this would result in $mCO_2 + lmH_2O/_2$ as combustion products. Assuming that the relation between the air used and the air theoretically necessary for complete combustion is n, and denoting the N-O ratio of the air as $N/O = k$; then the total vol. of combustion products may be expressed by: $V = V_{CO_2} + V_O + V_{OH_2O} + V_{N(total)}$, where $V_{N(total)} =$

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$V_{NCO_2} + V_{NO} + V_{NH_2O}$; and by combining in a simple manner these algebraic relations, the following equations are arrived at

$$n = \frac{V_{N(total)}}{V_{NCO_2} + V_{NH_2O}} = \frac{1 + \frac{l}{4}\frac{V_{CO_2}}{V}}{(1+k)\left(1+\frac{l}{4}\right)\frac{V_{CO_2}}{V}}; \quad (1)$$

$$(1+k)\left(1+\frac{l}{4}\right)xy - \frac{l}{4}x - 1 = 0; \quad (A)$$

$$\frac{(1+k)^2\left(1+\frac{l}{4}\right)}{1+k+\frac{kl}{4}}xy - \frac{l}{4}\cdot\frac{1+k}{1+k+\frac{kl}{4}}x - \frac{(1+k)\left(1+\frac{l}{4}\right)}{1+k+\frac{kl}{4}}y + \frac{l}{4}\cdot\frac{1}{1+k+\frac{kl}{4}} + 1 = 0; \quad (B)$$

$$\frac{4(1+k)^2\left(1+\frac{l}{4}\right)}{kl}xy - \frac{1+k}{k}x - \frac{4}{l}(1+k)\left(1+\frac{l}{4}\right)y = 0; \quad (C)$$

In (A), (B) and (C) the relations $\frac{V_{CO_2}}{V}$, $\frac{V_O}{V}$ and $\frac{V_{N\ (total)}}{V}$ are designated by x and n by y. All 3 equations represent hyperbolas of which the asymptotes are parallel to the axes, but removed from the latter by the distances 0, 0.21 and 0.79, resp. If we take a fuel consisting of CH_4, then (1) = 4, and for $n = 2$ we shall have $CO_2 = 5.54\%$. If the three hyperbolas in this case be plotted graphically, then having found the % CO_2, those for N and O can be read off directly from the plot. On the other hand, if for any particular type of C and H fuel the factor l remains const. and is detd. once for all by an elementary analysis, the plots of the 3 hyperbolas remain the same, and 1 detn., at any time, of the CO_2 content in the waste gases enables us at once to tell the % of N and O in the same, as well as the factor n. In this way a continuous automatic CO_2 reading instrument can be made to indicate simultaneously the excess of air. It is assumed above that the fuel in question contains no appreciable impurities like S, O and N and that the combustion is complete, *i. e.*, no fuel escapes in the form of unburnt C or CO. G. N. TERZIEV.

Résumé of Producer-gas Investigations. R. H. FERNALD AND C. D. SMITH. Bur. of Mines, *Bull.* 13, 393 pp. E. J. C.

Making Producer Gas from Crude Oil. H. A. GRINE. *Mining Sci. Press*, 103, 381-2.—Destructive distillation is objectionable because of clogging of the app. by the liberated C, and the waste due to formation of by-products. Destructive distillation combined with combustion is also objectionable, and for similar reasons. Another disadvantage is the high H and hydrocarbon content and the low CO content of the gas produced. Where combustion alone is used there is very little waste due to by-products, the CO content is high and clogging is avoided. At Hollywood, Cal., a crude-oil, producer-gas plant, based upon the last principle, is operated successfully. The gasification of the oil is complete, the gas has a heat value of 135–150 B. t. u. per cu. ft., and contains 15–16% CO, 4–5.5% CH_4, 6–8% H_2 and 1–1.2% illuminants. A saving in fuel cost of 66.6% is effected. EDW. WOLESENSKY.

Stokehole-closers for gas Producers. L. FRICKE. Peine. *Stahl u. Eisen*, 31, 964-7.—Illustrated descriptions. E. J. WITZEMANN.

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Furnace Problems (in Gas Works). R. TERHAERST AND H. TRAUTWEIN. *J. Gasbel.*, 54, 517–22; through *J. Soc. Chem. Ind.*, 30, 733.—The furnaces considered are: (1) Vertical, with 18 retorts; (2) chamber furnace; (3) horizontal, with mechanical charging; (4) inclined retort furnace. For the same coal and same temp. of carbonization there will be practically the same yield in heat units in the gas from the different systems. Coke and tar yields will probably not vary greatly and cyanogen may be neglected. In the case of the horizontal and inclined retorts the NH_3 yield is smaller by about 0.02% than in the other two cases. The horizontal furnace has some advantage in efficiency, all factors being considered. M. B. SMITH.

Producer Gas in Steel Works. C. BONE. *Chem. Eng.*, 14, 378–80.—The author discusses the operation of producers for production of gas for furnace work. Easily controlled blowing and steam saturation arrangements, properly designed grates and continuous feed are recommended. E. C. SCOTT.

Radiation in Explosions of Coal and Gas Air. W. T. DAVID. *J. Gas Lighting*, 115–362.—The author describes the expts. and gives the results of investigations of the phenomena of the explosions of coal gas and air in dull black-lined and silver-lined vessels. E. C. S.

Elimination of some Sources of Loss in a Large Producer Gas Engin Plant. J. G. CALLAN. *Chem. Eng.*, 13, 237–40.—About 20% increase in efficiency was obtained by using a gas mixture lean enough to produce a non-luminous flame, advancing the ignition point and regulating the firing of the producers so as to yield gas of uniform quality. E. C. S.

Otto Hilgenstock (Coke Oven) By-product Process. E. BURY. *J. Gas Lighting*, 114, 748–9; through *J. Soc. Chem. Ind.*, 30, 793.—Tar is extracted from hot gases above its dew pt. by passing the gas through hot tar sprays after which the NH_3 is extracted by H_2SO_4. About 5% more NH_3 is recovered than in the ordinary process. Coke-oven gas for lighting purposes is not lowered in heating value by this process. M. B. SMITH.

Production of Hydrogen from Water-gas. A. FRANK. *J. Gasbel.*, 1911, June 10; through *J. Soc. Chem. Ind.*, 30, 893.—It is recommended that plants for production of pure H and other gases by cooling and liquefaction should be installed at gas works. N would be useful as an inert gas in the plant for storing and transportation of inflammable liquids such as the petroleum products. The oxyhydrogen flame is already used as source of heat in the manuf. of quartz glass app. M. B. SMITH.

Methods of Testing Safety Lamps or other Apparatus for the Detection of Combustion Gases and Vapor. A. PHILIP AND T. STENHOUSE. *J. Soc. Chem. Ind.*, 30, 861–7.—A short description of the methods available, classed under 2 heads: (*A*) Testing in static mixtures; (*B*) testing in gas currents. Sources of combustible gas or vapor; methods of mixt. of combustible gas or vapor with air to give the desired mixt.; methods of detn. of chem. comp. of the mixt. of air and inflammable vapor or gas; streams of known and constant mixts. of combustible gas or vapor and air (to be used to demonstrate to coal miners, etc., that a practical knowledge of combustible gases or vapors in the air is essential) are discussed. All essential app. for the calibration of safety lamps and inflammable vapor detectors are described and illustrated. M. B. S.

Alkali Fixation of Luminous Salts. H. SILBERMANN. *Chem. Ztg.*, 35, 1037.—The process of impregnating mantles with the nitrates of the rare earths and then igniting and converting the nitrates into oxides has been largely supplanted now by the process of fixing the oxides as such by treatment with an alkali earth or a gaseous alkali in soln. Several of these processes have been patented. The new process of fixation described by S. utilizes the reaction involved in the mercerization of cellulose.

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The mantle, whether of cotton, ramie or artificial silk, is mercerized for ½ hr. in a bath of 30 Bé. NaOH, preferably in the absence of air, pressed dry between rollers, then immersed directly into the nitrate soln. for 15 min., whereby the Na in the cellulose is replaced by Th and Ce. By this treatment the mantle comes out of the bath entirely free from HNO_3. It is then air-dried and ignited. The process of mercerization reduces the length of the mantle to 1/2; a smaller quantity of oxides is fixed per unit wt. of mantle than by the ordinary process, and yet its light emitting power and its resisting qualities remain the same. G. N. TERZIEV.

Gases of Mud Volcanoes (KHARICHKOV). 8. Gasoline from Natural Gas (PETERSON). 22. Motorspirit from Natural Gas (TAYLOR). 22. Determination of Moisture in Fuel (CRISFIELD). 1. Absolute Light Measurement (HOUSTOUN). 2.

U. S., 1,005,210, Oct. 10. J. A. HERRICK, New York, N. Y. **Gas producer** having fixed upper and lower body portions and a revoluble intermediate portion, a revoluble cover portion, a revoluble poker and a revoluble feed hopper carried by the cover.

U. S., 1,005,711, Oct. 10. W. L. JOHNSON, Middlesbrough, Eng. **Generating steam** by pouring molten slag into H_2O to which milk of lime has been added, subjecting the steam thus formed to the action of NaOH and finally adding NH_3 to the steam to neutralize any acid present.

U. S., 1,005,832, Oct. 17. N. H. HENDERSON, Vernon, N. Y. **Mechanism for charging gas-producers.**

U. S., 1,006,797, Oct. 24. A. RUSBATCH, Cleveland, Ohio. **Gas producer,** comprizing a lower rotatable section and an upper fixed section, a horizontal rotatable shaft in the upper section and a number of hollow radially extending pokers supported by the shaft and opening into its interior.

U. S., 1,007,153, Oct. 31. H. SPURRIER, Detroit, Mich. **Treating coke containing sulfur** with a soln. of Na_2CO_3 in excess of the amt. which will combine with the S, to prevent S from the coke uniting with Fe in smelting.

U. S., 1,007,385, Oct. 31. H. PETTIBONE, New Rochelle, N. Y. **Cupola gas producer** having at the top a central, downwardly projecting air-supply chamber or pipe with a jacket forming an annular air passage, the inner wall of which has ports opening into the interior of the chamber, an air-inlet pipe connecting with the annular jacket, and a gas-outlet pipe connecting with the base of the cupola.

U. S., 1,007,439, Oct. 31. L. C. FLACCUS, New York, N. Y. **Apparatus for quenching coke.**

Ger., 229,083, Oct. 20, 1908. W. MÜLLER, Essen a. d. Ruhr. **Coke or gas chamber furnace.** The crude gas collecting chamber is narrower than the furnace-chamber; the channels conducting and distributing the gas are enclosed laterally and the crude gas collecting chamber laterally and above the ceiling by channels exclusively in connection with the atm.

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22. PETROLEUM, ASPHALT, COAL TAR AND WOOD PRODUCTS.

R. E. HUMPHREYS.

Technical Distillation Test of Petroleum. KHARICHKOV. *Chem. Ztg.*, 35, 1027. —Cu flasks are used instead of glass. J. H. MOORE.

The Coefficient of Expansion of Tar. J. M. WEISS. *J. Franklin Inst.*, 172, 277.

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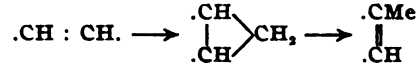
—The author has detd. the coeff. of expansion (per degree F.) of various tars and gives a table of results. E. C. SCOTT.

Action of Formalin on Naphtha Distillates: Formation of Liquid Condensation Products. A. M. NASTYUKOV AND K. L. MALYAROV. Techn. Lab., Univ. Moscow. *J. Russ. Phys. Chem. Soc.*, **32**, 1596–1604.—By digesting kerosene (b. 200–50°; $d_{25.6}^{25.6}$ 0.8414; formolite no. 12) with an equal vol. of formalin and 0.75 of its vol. of H_2SO_4 at ord. temp. a yield of 19% liquid condensation products, together with some solid products, was obtained. The *fraction* b_{50} 186–8° has formula $C_{18}H_{28}$; formolite no. 105; $d_{21.5}^{21.5}$ 0.8498; n_D^{23} 1.4703; viscosity 2.07 times the original kerosene or 6.57 in Engler's degrees. It is possible that in petroleum there exists a naphthene, $C_{14}H_{28}$, which reacts with CH_2O in such a way that the CH_2 of the latter forms a $(CH_2)_3$ group with CH : CH of the former, the O of the CH_2O oxidizing another mol. of the naphthene. The instability of the $(CH_2)_3$ ring then leads to the re-formation of the double union:



The *solid condensation products* are yellow amorphous powders, sol. in C_6H_6, PhMe, $PhNO_2$ and $CHCl_3$. They are termed sol. *formolites*. H. M. GORDIN.

Factors in Cost of Oil Production. WILLIAM R. JEWELL. *Mining Sci. Press*, **103**, 44–6.—Completely developed properties produce oil at about 8 cts. per bbl., those partly developed, 14 cts., and so on up to $5. R. E. HUMPHREYS.

Determination of the Origin of Lubricating Oils. N. CHERCHEFFSKY AND R. ESCUDIE. *Mat. grasses*, **4**, 2366–70.—Physical tests, such as d., viscosity, refraction, critical temp. of sol., temp. of turbidity, and a detn. of coke enable fairly reliable conclusions to be drawn. As guides, the values obtained from 4 Russian samples, 2 American, a Galician and a Roumanian are tabulated. C. R. BRAGDON.

Study of the Losses in Storage of Crude Petroleum and its Products. A. GUISELIN. *Mat. grasses*, **4**, 2323–6, 2363–4. C. R. BRAGDON.

Oil-firing Operations with Special Consideration of Coal Tar Oils for Metal-melting Furnaces. H. TEICHMANN AND W. BROSS. *Stahl u. Eisen*, **31**, 843–8, 1049–52. E. J. WITZEMANN.

Anticlinal Structure and its Relation to Oil. ARTHUR LAKES. *Petroleum Rev.*, **25**, 23–4, 41. R. E. HUMPHREYS.

The Generation of Oxygen by means of Naphtha Products. K. KHARICHKOV. *Neftjanoje Djelo*, 1911, 11; through *Petroleum*, **6**, 2309.—The effect of naphtha products and other hydrocarbons upon Co-naphthenic acid paper, a reagent for detecting H_2O_2, was studied. Purified machine oil showed the greatest power of generating O. The red color of the paper, in case of this oil, changed to a greenish yellow in 24 hrs., while kerosene caused this change only after 7 days' exposure. The more energetic the treatment of the kerosene with H_2SO_4, the weaker its action upon the paper. K. suggests this test to indicate the extent of the action H_2SO_4 upon refined oil. O. E. BRANSKY.

Kerosene and Radium. K. KHARICHKOV. *Neftjanoje Djelo*, **8** (1911); through *Petroleum*, **6**, 2308.—Oxidation phenomena cause the darkening of kerosene when exposed, in the presence of moisture, to sunlight. That H_2O_2 is formed in small quantities is readily shown by testing the oil with Co-naphthenic acid paper. Since $RaBr_2$ forms H_2O_2 when acting upon H_2O, K. attempted to hasten the oxidation of the kerosene by treating it with Ra. The results were negative. O. E. B.

A New Method for the Determination of Ash in Kerosene and Lubricating Oils.

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K. KHARICHKOV. *Neftjanoje Djelo*, 1911, 5, through *Petroleum*, 6, 2308.—The Na salts of the naphthenic acids in kerosene and lubricating oil are decomposed with gaseous HCl. Colloidal NaCl is formed, and the oil becomes turbid. This turbidity is then measured colorimetrically against *N* NaCl soln. in kerosene. Pure kerosene is then added to the turbid sample until the turbidity of the *N* soln. is reached. O. E. B.

Manufacture of Motor Spirit from Natural Gas. FRANK H. TAYLOR. *Petroleum Rev.*, 24, 357–8.—The yield is from 2–6 gals. per 1000 cu. ft. gas. Wells that have been pumped a long time, and those that have been allowed to blow until the pressure was off give the largest yields. It is also thought that the deeper the well the poorer the gas. R. E. HUMPHREYS.

Illumination by means of Denatured Alcohol and Kerosene. K. V. KHARICHKOV. *Kaiserl. Russ. Tech. Ges.*, Grosny sec., 1, (1911); through *Petroleum*, 6, 2308.—Detns. with the Weber photometer of 4 EtOH lamps and 1 kerosene lamp showed that the latter is equal in candle power and consumption of material to the best of the EtOH lamps. O. E. BRANSKY.

The Petroleum Resources of the World and their Distribution. J. MENDEL. *Petroleum*, 6, 962–71. J. J. M.

Petroleum Deposits in Roumania. L. MRAZEC. *Chem. Tech. Ztg.*, 29, 150–3.—Diapir folds and the oil deposits in regions with surface folding are discussed in detail. O. E. BRANSKY.

Oil Fields in Mexico. H. L. WOOD. *Oil and Gas J.*, 1911, 43; *Petroleum Rev.*, 24, 364; through *Petroleum*, 6, 2075–6.—The oil-bearing formations consist of shattered limestone. From Dec. 27, 1910 to Mar. 27, 1911, the Portrero del Llano well has produced 8 mil. bbls. of clear oil, without a trace of sand or water. The Chapapota well yields oil of especial value for the manuf. of asphalt. O. E. BRANSKY.

The Opening of Alaska's Oil Fields. W. T. PROSSER. *Petroleum Rev.*, 24, 359. R. E. HUMPHREYS.

Water, the Enemy of the Petroleum Industry. DORSEY HAGER. *Petroleum Rev.*, 25, 49–50, 81–2.—The different ways in which H_2O enters the oil well are shown, together with the methods of identifying the sources of the H_2O and the means of shutting it off. R. E. HUMPHREYS.

The Petroleum Resources of Illinois. RAYMOND S. BLATCHLEY. *Petroleum Rev.*, 25, 101–2.—Historical review. R. E. H.

The Downfall of Galician Petroleum Production. *Petroleum Rev.*, 25, 63.—The wells are being inundated with H_2O. R. E. H.

The Petroleum Resources of Wyoming. ANON. *Petroleum Rev.*, 25, 21–2, 51–2.—Wyoming is destined to be one of the greatest oil producing states, both in amt. of production and value of product. Following are analyses of oils from some of the fields:

	% Gasoline.	% Kerosene.	% Lubricating.	% Residuum.	Sp. gr.
Evanston	11	35	41	13	0.8503
Salt Creek	16	29	49	6	0.8221
Dallas	2	21	6	12	0.9121
Grey Bull	25	55	10	10	0.8446
Rattlesnake	..	..	70	30	0.9920
Conant Creek	..	..	77	23	0.9660
Shoshone	14	41	39	6	0.8121
Spring Valley	22	25	42	11	0.8339

R. E. H.

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The Petroleum Fields of Italy. *Petroleum Rev.*, 24, 367.—There are 32 wells in 3 districts. R. E. H.

New Roumanian Petroliferous Area of Filipeshti-de-Padure. ANON. *Petroleum Rev.*, 25, 5.—The exploiting company struck oil at 840 and 3060 ft., but continued boring to 3162 ft. A gushing well was there produced, yielding daily 1000 tons of oil rich in naphtha and with 4.5% of paraffin wax. This high % is explained by the fact that the deposit has had small migration, being situated very near the original bearing. R. E. H.

The Urycz Oil Fields of Galicia. ANON. *Petroleum Rev.*, 24, 353.—The crude does not contain paraffin wax and does not solidify at 15°. It contains 45% of light distillates. R. E. H.

Oil Fields of Tcheleken. ANON. *Petroleum Rev.*, 24, 349–52.—Gushers are producing 4000 tons of crude oil in a few hrs. The oil sands are found at 400–500 ft., and the crude is of higher quality than that of Baku, because it is rich in paraffin wax. Rich veins of ozocerite, 15 ft. thick, have been discovered. R. E. H.

Petroleum from Taman. V. F. HERR. *Kaiserl. Russ. Tech. Ges.*, 1911, 3 and 4; through *Petroleum*, 6, 2308–9.—The oil has a d_{14} of 0.816, flash pt. 13°, n 1.458, an asphalt content of 5% and a condensation no. (methylal) of 60. Filtered through fuller's earth, it gave in the Lippisch polarimeter a rotation of +0.90. It contains traces of paraffin. Distillation yielded 26.87% benzine, 53.5% kerosene and 19.6% masut. The fraction between 72–80° gave 7.8% C_6H_6. Lubricating oils of high d., but low viscosity are obtained. The naphthenes are present in small quantities. O. E. BRANSKY.

The Hilgenstock By-product Process (BURY). 21. Gases of Mud Volcanoes (KHARICHKOV). 8. Producer Gas from Crude Oil (GRINE). 21.

U. S., 1,005,425, Oct. 10. E. B. GRAY, Beaumont, Tex. **Apparatus for concentrating weak acid from petroleum sludge,** comprizing a series of open pans and stills provided with water-jacketed hoods and condensers and a furnace, a pipe leading from each still to each condenser to convey the residue of uncondensed vapor from the still to the condenser, a pipe for conveying the condensed products from each condenser to the stills, a H_2O-supply pipe, and a discharge pipe for leading the uncondensed gases from all the condensers to the H_2O-supply pipe.

U. S., 1,005,977, Oct. 17. R. C. JONES, Los Angeles, Cal. **Purifying crude petroleum** by centrally heating a column of oil with an open space above it, supplying oil to the column through the open space, allowing vapor to escape from the top of the column, trapping the column of oil by H_2O at its bottom and conducting the oil through the H_2O-trap and then to a hollow tubular stream reversely flowing in alternately ascending and descending columns concentric with the central column, each successive column encircling the preceding one, and meanwhile maintaining a practically constant depth of oil in the columns and above the trap so as to deposit impurities from the oil to the H_2O in the trap and minimize the loss of heat by radiation and maximize the fluidity of the oil, steam being applied to the top of the oil to reduce any foam.

U. S., 1,007,341, Oct. 31. T. A. DUNGAN, Chicago, Ill. **Wood-distilling apparatus** including a car having beneath its contents a series of troughs each overhanging the next of the series and spaced from it so that fluid falling from the wood will be caught by the troughs while space is provided for the upward passage of heated air.

Ger., 229,193. Nov. 19, 1909. Addition to 218,958. A. KOBE, Halle a/S. **In the extraction of bituminous substances** with high b. p., the alc. is sepd. more or less

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from the watery liquid contg. it and this alc. is used again for the extraction of the bituminous compds. with a high b. p., as coal oil residues, etc., the emulsions not being extracted. *E. g.*, 100 cc. of a 3% soln. of bituminous substances are dild. and distilled in alc. of 96% with the same quantity of H_2O. First 40% and then after replacing the converted alc. by that much H_2O, 10% more of alc. is distilled out of the liquid. From the 96% of alc., 76% is regained, which then is brought up to the required % in the column app.

23. CELLULOSE AND PAPER.

A. D. LITTLE.

Chemistry of Cellulose and the Cellulose Industry. A. SANDER. *Fortschritte Chem.*, 4, 293–307.—Review of progress during 1909–10. J. J.

Chemical Processes Occurring in the Preparation of Cellulose by the Sulfate Method. P. KLASON AND B. SEGERFELT. *Archiv. Kem. Min. Geol.*, 4, No. 6, 1–20; *J. Chem. Soc.*, 100, I, 264.—The method involves the treatment of wood with a lye of which NaOH and Na_2S are the chief constituents, whereby saccharinic acids are developed from the carbohydrates and neutralize the alkali. These acids include, together with *m*- and *p*-saccharinic acids, a new form *sapin-isosaccharinic acid*. Accepting Nef's theory, the gum-like carbohydrates would consist essentially of one of the keta-hexoses, *l*-fructose, *l*-pseudofructose, *l*-tagatose, or *d*-sorbose. Along with the foregoing developments, the lignin mols. break down into simpler ones, which, because they contain hydroxyl groups, also dissolve in the alkali. Saponification destroys about 1/5 of the methoxy groups, thus augmenting the solvent action of the alkali. This latter creates, in the b. soln., MeOH, MeSH and Me_2S. Increase in alkali increases the amt. of MeSH formed, whereas decrease in alkali results in increase in Me_2S.

C. G. GILBERT.

Degree of Bleaching (SCHWALBE). 25. Artificial Silk (DULITZ). 25.

U. S., 1,005,454, Oct. 10. C. MIJNSSEN, Wilmersdorf, Ger. **Acetylcellulose sheet** composed of 2 exterior layers of acetylcellulose and an intermediate layer of acetylcellulose containing a softening agent, *e. g.*, acetophenone.

U. S., 1,005,882, Oct. 17. E. L. RINMAN, Gottenborg, Sweden. **Precipitating ulmous substances, in filterable form, from waste liquor from soda pulp mills,** by treating liquor of about 20° Bé. at 75° with CO_2 in the presence of NaCl.

24. EXPLOSIVES.

C. E. MUNROE.

The "Liberte" Disaster and Propellant Powders. EDIT. *Engineering*, 92, 463.—A controversial article advocating cordite and opposing straight cellulose nitrate powders on the ground that the acetone used with the former is a more complete colloidizing agent than the ether-alcohol used with the latter and that as the former is protected by non-volatil mineral jelly it may be aerated freely and is not subject to fluctuations in moisture contents, while the reverse is true of straight cellulose nitrate powders. Moreover, it is claimed that "a nitrocellulose powder is inherently less stable, is influenced by fluctuations in moisture, with consequent loss of accuracy in shooting, necessitating its enclosure in hermetically sealed cases, which not only prevent its aeration, but also render its systematic inspection and testing more difficult."

CHARLES E. MUNROE.

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Nitroglycerin Yields and Mixed Acids for Nitroglycerin. C. GOPNER. *Chem. Ind.*, 34, 307–9.—A criticism of work by Soddy (*C. A.*, 5, 1841) to det. the best ratio of H_2SO_4 to HNO_3 in the mixed acids used in nitrating glycerol. The results have been recalc. on the basis of anhydrous acids showing a better yield and less acid really used. The best yield, 225.72% of nitroglycerin based on the glycerol used, was obtained using 261.9 parts H_2SO_4 and 224.5 parts HNO_3 to 100 parts glycerol. The av. comp. of the spent acids was: H_2SO_4, 73; HNO_3, 7; H_2O, 15.7; and nitroglycerin, 4.3%. According to Soddy, the nitroglycerin yield is increased by 1% for each degree between 20° and 13° that the temp. of its sepn. from the acids is lowered.

E. J. CRANE.

Ash-free Gelatin (DHÉRÉ). 11.

U. S., 1,005,739, Oct. 10. J. G. NATHURST, Kingston, N. Y. **Non-freezing plastic explosive** containing a nitrated dextrin having about 12.75% N, nitrocellulose having about 12.25% N, nitroglycerin and NH_4NO_3 or other nitrate.

U. S., 1,007,276, Oct. 31. F. I. DU PONT, Wilmington, Del. **Solidifying crystallizable mixture** (*e. g.*, moist black gunpowder mixt.) **without substantial crystallization** by forming the mixt. into a thin sheet, chilling it, breaking up the sheet and forming it by pressure into a sheet of the desired thickness.

U. S., 1,007,409, Oct. 31. S. W. YOUNG, Palo Alto, Cal. **Cartridge for destroying fumes from dynamite, etc.,** containing MnO_2 35% and $(NH_4)_2CO_3$ 65%.

Ger., 229,103, July 16, 1909. WESTPHÄLISCH-ANHALTISCHE SPRENGSTOFF AKT.-GES., Berlin. Production of **explosion-damp** which corresponds to the theoretical max. d. of charge. Into an explosion bomb serving as a protective vessel is placed a body with a boring of metal, carbon, salt, cement, stone or other suitable material; the explosive means is placed in the boring and then the dynamite, guncotton, etc., is exploded with or without exhaustion of air.

Ger., 229,180, Feb. 15, 1908. C. PAULING, Leipzig-Lindenau. **Protecting fire arms against rusting** by means of a soln., free of oil and fat, of alkalies in glycerol. Soap and alc. are preferably added in order to ensure adhesion to the metallic surface. The soap is obtained from castor oil and alkalies with the aid of alc. Pure glycerol is then added to the soap with beating, and a further quantity of dissolved alkali is admixed.

Ger., 229,187, May 11, 1906. A. SWOBODA & ENZESFELDER MUNITIONS- UND METALLWERKE AKT.-GES., Wien. **Igniting compound.** In the principal patent the compd. free of P and S, contains besides the actual igniting substances, powdered cork, flour, and Fe. In order to use this compd. for the ignition of army-powder, an addition of substances producing a similar action, such as $KClO_3$, is necessary, that is, compds. liberating O but retarding the combustion, as PbO, Ca plumbate, or the like. *E. g.*, such an igniting compd. consists, for smokeless powder, of H_2O 88, gum 30, $KClO_3$ 60, amorphous P 10, K_2CrO_4 7, flour 3, Fe_3O_4 5, PbO or Ca plumbate 20 and S 10. The detonators are filled with this compd., dried for about 1 hr at 75°, and covered with a layer of hard fatty substances such as wax, stearin, paraffin, etc.

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25. DYES AND TEXTIL CHEMISTRY.

L. A. OLNEY.

Fastness of Color of Methylated Hydroxyazo Dyes. Some Derivatives of α-Methoxynaphthalene. N. N. VOROZHOV. Vienna. *J. Russ. Phys. Chem. Soc.*, 42,

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1845-65.—Methylation of hydroxyazo dyes by means of Me_2SO_4 greatly increases the fastness of color. A comprehensive table is given showing cryst. form and behavior towards reagents of both the non-methylated and the methylated substances. By reducing *1,4-sulfonaphthaleneazoanisole* obtained by this method, *p*-anisidine is formed. By reduction of other azo compds. containing the α-methoxynaphthalene group and acetylating the product, *1,4-methoxyacetaminonaphthalene*, $C_{13}H_{13}NO_2$, (I), was obtained; colorless prisms, m. 180–1°. *Na 1,4-methoxynaphthalene sulfonate*, $C_{11}H_9SO_4Na.3H_2O$ (II), was obtained by methylating Na 1,4-naphtholsulfonate; efflorescent crystals. *Ba salt*, glittering nacreous crystals. *1,4-Methoxynitronaphthalene*, $C_{11}H_9NO_3$ (III), was obtained by the action of HNO_3 (1.4) on a mixt. of (II) and Na_2CO_3; needles, m. 81°. By reducing and subsequent methylation (III) changes to (I).

H. M. GORDIN.

Action of Light on Dye Systems. III. Examination of the Primary Formation of the Peroxides of Dyes. K. GEBHARD. Munich. *Z. angew. Chem.*, 23, 820; cf. *C. A.*, 5, 1517.—In the following expts., dianil blue, a direct dye on cotton, malachite green, a triphenylmethane dye and alizarin were used. The formation of peroxides was observed by exposing solns. of the dye as well as of the dyed fibers. The best results were obtained by using KI, $KMnO_4$, or diphenylamine as tests for the presence of peroxides. It is necessary in all cases to run blanks with the same dye kept in the dark. In aq. soln. the amt. of peroxides formed depends on the source of light, while on the fiber, the nature of the fiber, the moisture content, the amt. of mordant and salt all influence their formation. The colors of the spectrum which caused the formation of peroxides are the complementary colors of the dye; the blue, violet and ultraviolet rays either decompose the peroxides, or carry the active O to a new mol. of dye. Very large amts. of peroxide were obtained by working in a Pt dish (catalytic action). Most of the peroxide dyes are stable, and in some cases they can be decomposed with regeneration of the original dye. The fact that dyes on the fiber seem to be more stable in presence of dry air than in moist is only apparent, since the peroxides thus formed bleach just as rapidly as soon as moisture is introduced. More O is used in this bleaching action than could be accounted for by simple oxidation, and this is demonstrated by treating the dye with O generated at the anode of an electrolytic cell in presence of light. The following facts contradict the formation of primary peroxides. One obtains, by bleaching dyes, organic peroxides not of the simple H_2O_2 types; the dye bleaches most in presence of H_2O_2 in that solvent in which it is most highly dissociated (in absence of H_2O_2 the most in organic solvents); in presence of many substances, the bleaching is more rapid than in presence of H_2O_2; while small amts. of alkali hasten the action, large amts. effect decomp. By electrolysis of alizarin it was proven that it is the OOH ion which effects the decomp. of the dye.

SIDNEY BORN.

Modern Tar Dyes and their Genuin Qualities. P. KRAIS. *Z. angew. Chem.*, 23, 387.—A discussion of the qualities which the tar dyes should have for various purposes.

S. B.

Sensibility of Coal Tar Colors. P. KRAIS. *Z. angew. Chem.*, 23, 1206.—A discussion of the sensibility of coal tar colors to light. In 5 sections, *viz.*, carpets, embroidery cotton, wall paper, paper colors and wood colors. Coal tar dyes on carpet resist light better than natural plant dyes. The same was found true of embroidery cotton and wall paper. No light-resisting dyes have been found for paper or wood.

S. B.

Fastness to Light and Behavior of Different Coal Tar Dyes Taken as Printing Colors. E. VALENTA. *Chem. Ztg.*, 33, 1165.—V. has taken a great many dyes and used them for the purpose, noting their sensitiveness to light. Most of them gave good results.

S. B.

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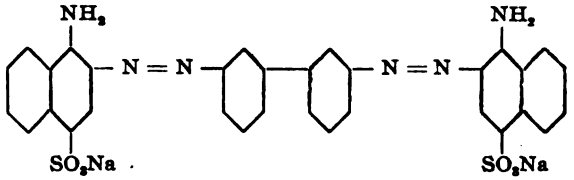
Genuinness of Dyes. P. KRAIS. *Z. angew. Chem.*, 24, 1810–1.—A discussion of the properties which dyes must have to satisfy dyers and the public. S. B.

Investigation of Congo Blue and the Preparation of Congo White. I. W. FAY, A. H. TAG AND M. G. HAWKINS. *Polytechnic Eng.*, 10, 21.—An investigation of the chem. changes in Congo red used as an indicator when the red is changed to blue by acids. As Congo red is the Na salt of an acid, it has been generally assumed that when the soln. is acidified H replaces Na. A consideration of the structure will show that the acid may act at 4 different points.



It may replace Na or unite with amino groups to form addition products. Analysis to find out whether the pure Congo blue contains Na or Cl (the latter would prove the presence of addition products with HCl) showed no Na or Cl. By b. aniline and Congo blue, a deep red soln. containing a ppt. is obtained. The red ppt. is the aniline salt of Congo blue. The filtrate yields white crystals, a dianiline salt, or Congo white. When an acid is added to a soln. of Congo red, no Na remains in the blue compd. formed. No HCl is added to NH_2 groups. Excess of acid is necessary to ppt. a blue compd. completely. S. B.

Indigo Yellow. B. WUTH. *Färber Ztg.*, 22, 343–5.—When indigo is heated with benzoyl chloride it forms dibenzoylindigo, a brown amorphous powder, m. 108°. If metals or metallic salts are present the reaction is different and a yellow condensation product, m. 275–7°, is formed. This cannot, by sapon. agents, be brought back into indigo as can dibenzoylindigo. The chem. constitution is still unknown, but it is certain that only one benzoyl group has entered the indigo mol. Mol. wt. 346. It dyes cotton from the vat in greenish yellow shades and yields by chlorination or bromination, yellow *dyes* of increased fastness and affinity for the fiber. (Also in *Chem.-Ztg.*, 35, 667.) A. S. HALLAND.

Practice in Aniline Dye Manufacture. J. WALTER. *Chem. Ztg.*, 34, 641, 667, 681, 690–701.—The technical prep. of dimethylaniline is carried out as follows: Each autoclave receives a charge of 80 kg. aniline, 78 kg. MeOH and 8 kg. H_2SO_4, 66° Bé., and is heated several hrs. to 230–235°, thermometer outside, with a pressure of 28–32 atm. After cooling, the mass is transferred to a steam still containing the necessary amt. of alkali and is steam distilled. Yield 98 kg. dimethylaniline (92% of theoretical). A description of the app. used follows. SIDNEY BORN.

Certain Shades Obtained with Metallic Salts. P. MONTAVON. *Rev. gén. mat. color.*, 15, 253–5.—Formulas are given for producing cream, chamois, nankin and khaki shades with Fe salts and straw, canary, jonquil, gold and orange shades with Pb salts. MILES R. MOFFATT.

Bleaching, Dyeing, Printing and Finishing at the Roubaix International Exposition of 1911. E. DUHEM. *Rev. gén. mat. color.*, 15, 255–9. M. R. M.

Dyeing and Printing Cotton Cloth with Indanthrene Colors. BADISCHE ANILIN- UND SODA-FABRIK. *Rev. gén. mat. color.*, 15, 200–4. M. R. M.

Bleaching and Dyeing Artificial Silk. A. DULITZ. *Chem. Ztg.*, 35, 189–90.—The raw silk as it comes from the denitration process has a dirty green color which must be bleached. $Ca(OCl)_2$ cannot be used as it weakens fiber. NaO_2, H_2O_2 and

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Na perborate are too expensive. Electrolysis of NaCl soln., resulting in formation of NaOCl, was the cheapest and best process. Better results were obtained if the silk was washed in soap water before and after electrolysis. Drying is best carried out in centrifugals by tying the silk in cloths. D.'s observations confirm his belief that art. silk consists of mixts. of cellulose, hydrate-cellulose, hydro- and oxycellulose.

S. B.

New Process for Dyeing Silk. L. PAUL. *Z. angew. Chem.*, **24**, 1857–61.—This process depends on fact that silk fiber either in pure state, or weighted, will combine with disazo and tetraazo combinations so that they are proof against repeated washings. It is not a mechanical process because the silk turns pale yellow when so treated. 0.5 g. silk, covered with 10 cc. H_2O, is treated with 1–3 drops of very dil. disazo or tetraazo soln. (3 drops = 0.00033 g. substance). After all the azo compd. has disappeared (test with any phenol) the silk is thoroughly washed and then treated with an equally dil. soln. of (1) α- or β-naphthylamine-HCl, and (2) weak, alk. soln. of α- or β-naphthol. Thus the dye is fastened on the fiber without the slightest trace being found in the soln. These dyed fabrics are proof to water, soap and light. Cotton and wool will not form these compds. *Action of sulfuric acid on resorcinol.* One g. of b. resorcinol was treated with 10 drops of H_2SO_4 (12 1/2 cc. H_2SO_4 (87° Bé.) and 20 cc. fuming H_2SO_4). Dil. with water and pour into 10% NaOH. A deep bluish red soln. is obtained. This soln. is carefully acidified. Deep red powder by fractional ppt. gives Ri, bluish red, and FL, greenish fluorescent substance. These products unite easily with di- and tetraazo compds., giving dyes which have properties of fixing the fiber. This work resulted in the above method. Similar results were obtained with β-naphtholsulfonic acid and resorcinol. S. B.

Augmenting the Affinity of Natural and Artificial Silks for Dyes. A. SANSOME. *Rev. gén. mat. color.*, 15, 194–7.—Treatment of *Bombyx mori* silk with cold 90% HCOOH causes it to swell up and become soft, gelatinous and elastic. After washing and drying, the treated silk is harder, coarser and sometimes more brilliant than before, as if a mercerizing effect had been produced. The treated silk also attracts dyes more energetically and is dyed a deeper shade. By this method a crimped effect is produced with silk-cotton material while silk-wool fabrics are unchanged, the wool attracting the HCOOH to itself and thus protecting the silk. Tussah silk is unchanged. Artificial silk has a greater affinity for substantive dyes after a HCOOH treatment for several hrs. MILES R. MOFFATT.

Artificial Tulle. L. LEFEVRE. *Rev. gén. mat. color.*, 15, 193–4; cf. *C. A.*, **5**, 2559. M. R. M.

The Methods of Preserving Weighted Silks. G. GIANOLI. *Rev. gén. mat. color.*, 15, 197–9.—Tenacity and elasticity tests on weighted silks protected against deterioration by the Herzog (5% $Na_2S_2O_3$) and the Meister (5% HCHO, and HCOH + $NaHSO_3$) processes show that these are not as good as the Gianoli and Sisley method which makes use of thiourea as the protecting agent. The protective action of these reagents depends on the fact that they keep the Fe salts, which are always present in weighted silks, in the state of minimum oxidation. Degradation of the silk always takes place when the Fe can readily pass from the ferric to the ferrous state in contact with organic substances. A table of dynamometer tests is given. M. R. M.

Machine-dyeing of Woolen Yarn on Bobbins. J. M. GANDIT. *Rev. gén. mat. color.*, 15, 199–200. M. R. M.

Some New Processes for Discharging Indigo. ANON. *Rev. gén. mat. color.*, 15, 266–7.—A feature of the formulas which are given is the addition of a 30% paste of anthraquinone. This is said to act as a catalyzer in assisting the reduction of the

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indigo, and it also protects the reduced indigo against rapid oxidation during the subsequent steaming and washing. M. R. M.

The Action of Glauber Salt in the Hot Dye Bath. ERNST KRAUS. *Färber Ztg.*, 22, 333–4.—K. Arndt found that a Na_2SO_4 soln. became alk. to red litmus on b. Under the influence of heat the following reaction takes place: $Na_2SO_4 + H_2O \rightleftarrows NaOH + NaHSO_4$ and the OH ions cause the alkalinity. K. carried out expts. with solns. of cryst. Na_2SO_4 containing 10 and 5 g. in 100 cc. water. To these were added lacmoid tincture and 0.05–0.2 cc. *N* HCl. On b. the pink solns. turned blue to bluish violet. Solns. of NaCl treated in same manner remained pink on b. This behavior of Glauber salt might explain why a great many acid colors dye more level with Glauber salt than with NaCl and why a b. Glauber salt soln. can dissolve more color from dyed matter than b. water. It is advizable to avoid the use of Glauber salt for dyeing such direct colors as are sensitive to alkali. A. S. HALLAND.

"Norgine." E. SCHMIDT. *Chem. Ztg.*, 34, 1149–50.—Norgine is the sol. $NaNH_4$ salt of laminaric acid. It is prepared from *Laminaria digitata* and *Saccharinus digitatus* and is used technically for "finishing." It comes into the market as a lightly colored amorphous powder, which forms a yellow colloidal soln. in water, is pptd. by acids and as salts by some metals. S. B.

"Norgine." WELWART. *Chem. Ztg.*, 34, 1239.—Qual. exam. of "Norgine" showed presence of glucose, starch and dextrin. A sample sent from the factory contained no dextrin while those purchased in open market contain up to 30%. S. B.

Color Lakes on the Fiber. E. GRANDMOUGIN. *Chem. Ztg.*, 34, 990.—For the spectrum analysis of dyes the color lakes on fibers are important. The simple lakes can be removed by suitable solvents and the spectrum of the soln. examd. The lakes which are obtained by means of mordants can be subdivided into those in which the dyes can be isolated by suitable treatment and those which can not be regenerated as dyes and are held as complex metallic compds. The latter class includes the chrome dyes, and by examg. the soln. of the latter one obtains the spectrum of the chrome deriv. and not that of dye itself. A study of the spectrum of various lakes would afford in many cases important conclusions as to their structure. SIDNEY BORN.

Theory of Weighting Silk. P. SISLEY. *Chem. Ztg.*, 35, 621–2.—A discussion of the weighting of silk with Sn hydroxide, Sn phosphate, Sn silicophosphate and Sn-Al silicophosphate. SIDNEY BORN.

Theory of Silk Weighting. P. HERRMANN. *Chem. Ztg.*, 35, 829–30.—Sisley (preceding abstr.) has proposed an "impregnation" theory which accounts for the weighting of silk with tin salts, by the absorption of tin salt, and subsequent hydrolysis by washing, and so fixing it in the fiber. Against this theory are the facts that: (1) the nature of the fiber plays an important role in the metallic treatment, (2) the absorbed material is distributed uniformly through the mass and is fast to b., rubbing, and dust; (3) length of time of impregnation, the temp., the conc., and the basicity of the bath play an important role; (4) working power of bath is not proportional to its hydrolytic dissociation; (5) mass of mechanically adhering substances makes no difference; (6) temp. of the bath rizes during the treatment; (7) bath loses material during process. In a series of expts. on carefully dried silk, H. impregnated in a Sn bath, then washed, and found that the silk actually gained twice as much tin as the bath lost and this he explains by saying that it is hydro-catalytically fixed from the mechanically adhering particles of the bath. SIDNEY BORN.

Stearin Soap for the Extra-soft Finishing of Cotton. H. ROUSSET. *Mat. grasses*, 4, 2375. C. R. BRAGDON.

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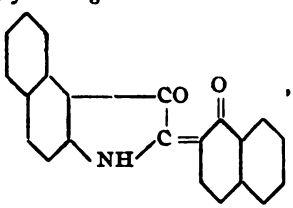
Bleaching of Tussah Silks. FRANCIS J. G. BELTZER. *Färber Ztg.*, **22**, 277–9.—The silk is "boiled-off" in a bath containing 1000 kg. water, 10 kg. benzine soap and 2–5 kg. Na perborate, at 60–70°. When the goods have remained 3–4 hrs. in this bath they are washed and placed in a lukewarm soln. of H_2O_2 (6–10 vol. per c.) made slightly alk. with NH_3, left for 24 hrs., then washed with a 0.1% soln. of $H_2C_2O_4$, rinsed and finally after-bleached in a 1% soln. of "Blankit" at 30–40° for 24 hrs. In this manner a brilliant white product is obtained. A. S. HALLAND.

Bleaching and Dyeing of Linen, Hemp and Jute. E. KOECHLIN. *Färb. Ztg.*, **20**, 304–5; through *Chem. Zentr.*, 1909, II, 1600.—Linen is dyed practically like cotton, but on account of impurities present, it is necessary to first boil it with 10% soda and bleach it. Properties of hemp are similar to linen. Hemp is bleached slightly before dyeing. The dyeing properties of jute are intermediary between cotton and wool. The pectin substances which it contains form a mordant for certain acid and basic dyes. SIDNEY BORN.

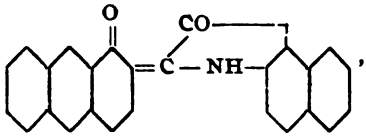
Determination of the Degree of Bleaching. C. G. SCHWALBE. Darmstadt. *Z. angew. Chem.*, **23**, 924.—W. Vieweg (*Papierztg.*, **34**, 49) and Piest (*C. A.*, **4**, 2227) have proposed a method for detg. the degree of bleaching by treating the fiber with NaOH, and calculating the amt. used, which should represent the amt. of oxy- and hydrocellulose present. Among the many objections to this method are the facts that the alkali dissolves small amts. of cellulose, and that the alk. sol. substance does not necessarily depend on the amt. of oxy- or hydrocellulose. S. prefers the Cu method and points out the following details which should be observed. While b. the cotton with Fehling's soln. keep it always covered with soln. Avoid stirring too rapidly with consequent formation of a vortex. Do not use rubber stoppers as these yield reducing substance. Filter the Fehling soln. through glass wool. SIDNEY BORN.

U. S., 1,005,140, Oct. 10. W. BAUER, Vohwinkel, and A. HERRE and R. MAYER, Elberfeld, Ger. **Dye**, probably having the formula



a dark cryst. powder with a metallic luster, sol. in conc. H_2SO_4 with a dark blue color and yielding with hydrosulfite and NaOH a yellow vat from which cotton is dyed a gray to black fast to Cl; made by condensing β-naphthisatin-α-chloride with 4-bromo-1-naphthol.

U. S., 1,005,141, Oct. 10. *Idem.* **Dye**, having the formula



a dark violet cryst. powder, sol. in conc. H_2SO_4 with a dark blue color, and yielding with hydrosulfite and NaOH a yellow vat from which cotton is dyed a violet-gray to reddish black fast to Cl; made by condensing β-naphthisatin-α-chloride with 1-anthrol.

U. S., 1,005,176, Oct. 10. PAUL EHRLICH and L. BENDA, Frankfort a/M, Ger.

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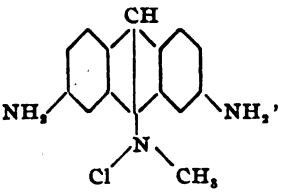
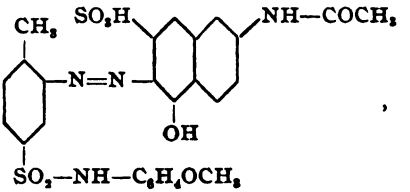
Assignor to Cassella Color Co., New York, N. Y. **3,6-Diamino-10-methylacridinium chloride,**



a brownish red cryst. powder, very easily sol. in cold H_2O with an orange color and a slight green fluorescence, easily sol. in MeOH and EtOH with a very intense green fluorescence, the soln. of which in HCl turns purple by the addition of $NaNO_2$, and which dyes cotton treated with tannic acid yellow shades fast to soda and soaping; made by treating 3,6-bis-acetamino-acridine with Me *p*-toluolsulfonate and saponifying with HCl.

U. S., 1,005,233, Oct. 10. R. Kothe and H. Hoerlein, Vohwinkel, and O. Dressel, Elberfeld, Ger. Assignors to Farbenfabr. vorm. F. Bayer & Co., Elberfeld, Ger. **Dye,** probably having the formula



its Na salt being a red powder sol. in H_2O with an orange-red and in conc. H_2SO_4 with a red color, yielding on reduction with $SnCl_2$ and HCl 2-toluidine-4-sulfo-*o*-anisidide and 2,6-diamino-5-naphthol-7-sulfonic acid, and dyeing wool from acid baths brilliant orange; made by combining the diazo compd. of 2-toluidine-4-sulfone-*o*-anisidide with 2-acetylamino-5-naphthol-7-sulfonic acid.

U. S., 1,005,354, Oct. 10. F. F. Strong, St. Petersburg, Fla. **Converting fibrous plants** (*e. g.*, palmetto) **into textil fiber and pulp** by subdividing the plant material, mixing the stock obtained with a salt soln. and partially dissociating the smaller fibers by electrolytic action while in the soln. and immediately and as a continuous procedure further refining the pulp in the presence of NaOH.

U. S., 1,005,481, Oct. 10. A. Schmidt, Höchst a/M, Ger. Assignor to Farbwerke vorm. M. L. & B., same place. **Indigo-white preparations suitable for vats,** capable of causing the indigo forming by re-oxidation during the working of the vat to sep. in an extremely finely subdivided and very quickly reducible form, being readily sol. in dil alkalies and consisting of a portion which after acidulation with dil. acids is insol. in hot H_2O, showing the reactions characteristic of indigo white, and a portion which, after acidulation with dil. acids, is more readily sol. in hot H_2O, showing the reactions characteristic of benzylanilinesulfonic acid; made by adding 5–15% of a benzylsulfanilate to an indigo white comp.

U. S., 1,005,888, Oct. 17. A. Rutler, Sunbury, Pa. **Dyeing fabric** by showering dye upon a span of the material while it is being moved under tension directly over the dye bath and allowing the excess of dye to flow freely from the span into the bath for reuse.

U. S., 1,006,051, Oct. 17. A. Blank and M. Latten, Leverkusen, Ger. Assignors to Farbenfabr. vorm. F. Bayer & Co., Elberfeld, Ger. **Dye,** the urea of *p*-

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aminobenzeneazo-1-amino-8-naphthol-4,6-disulfonic acid, its Na salt being a dark powder sol. in H_2O with a bluish red color and in conc. H_2SO_4 with a bluish violet color, yielding on reduction with $SnCl_2$ and HCl CO_2, *p*-phenylenediamine and 1,2-diamino-8-naphthol-4,6-disulfonic acid and dyeing cotton brown shades which on being developed on the fiber with diazotized nitroaniline yield green shades fast to light and washing but which can be readily discharged.

U. S., 1,006,097, Oct. 17. M. KAHN and A. OSSENBECK, Elberfeld, Ger. Assignors to Farbenfabr. vorm. F. Bayer & Co., same place. **Dyeing brown shades** fast to washing and which can be readily discharged, by first treating the fabric with a soln. of the dye; *p*-sulfanilic acid, acid-azo-*m*-phenylenediamine and then passing the goods through a bath of diazotized *p*-nitroaniline.

U. S., 1,006,142, Oct. 17. E. G. STARK, Altchemnitz, Ger. **Treating brittle vegetable fibers,** *e. g.*, the down of the seed of kapok (*Eriodendron anfractuosum*), *Calotropis procera*, or cotton silks, with hot H_2O containing HCl, to dissolve incrusting substances, extracting the latter and shrinking the smooth surface of the fiber and rendering it rough.

U. S., 1,006,471, Oct. 24. H. EICKEN, Grevenbroich, Ger. **Dyeing apparatus.**

U. S., 1,006,502, Oct. 24. W. M. ROSSITER, Sunbury, Pa. **Dyeing apparatus.**

U. S., 1,006,726, Oct. 24. W. J. CROSTON, Lawrence, Mass. **Scouring or cleaning** wool by subjection to a solvent containing benzine, alc. and CS_2, pressing and agitating.

U. S., 1,006,738, Oct. 24. W. EMMERICH, Höchst a/M, Ger. Assignor to Farbwerke vorm. M. L. & B., same place. **Red dyes of the triphenylmethane series,** made by condensing 1 mol. proportion of a benzaldehydedisulfonic acid with 1 mol. proportion of a monoalkylated and 1 mol. proportion of a dialkylated *m*-aminophenol, and transforming the leucodisulfonic acids thus obtained into dyes by oxidation, after closing the pyrone ring, the Na salts of the products being red to brown powders readily sol. in H_2O and dyeing wool and silk pure red tints while leaving intermixed cotton threads undyed.

U. S., 1,006,929, Oct. 24. H. FREIMANN, Stockum, near Düsseldorf, Ger. **Azo dye** made by condensing 1 mol. proportion of toluylenediaminesulfonic acid (1 : 2 : 6 : 4) with phosgene and 2 mol. proportions of aminonaphtholsulfonic acid (2 : 5 : 7) and combining the product with 2 mol. proportions of a diazo compd.

U. S., 1,007,104, Oct. 31. M. HESSENLAND, Höchst a/M, Ger. Assignor to Farbwerke vorm. M. L. & B., same place. **Dye,** 4-aminoanthraquinone-1-thioxanthone, a blue powder, insol. in H_2O, alc. and ether, sol. in hot $PhNO_2$ with a blue color and in alk. hydrosulfite with a reddish blue color and dyeing cotton blue.

Brit., 25,986, Nov. 8, 1910. G. GUADAGNI, S. Pietro in Vorzòlo, Pavea, Italy. **Improvements in the process of mfg. artificial silk,** described in 1,265, 1908, consisting in adding to the NH_3 contd. in the agitator, after the insufflation of air has taken place, a quantity, about equal in wt. to that of the cotton that is afterwards to be dissolved, of a conc. soln. of NaOH. the d. of which varies between 10–25° Bé., in proportion to the temp. at which the operation takes place, and adding, in order, $Cu(OH)_2$ and the cotton, for the purpose of obtaining a conc. colloidal soln. which is of greater fluidity than that referred to in the principal patent, and also possesses better properties of spinning.

Ger., 228,042, Oct. 5, 1909. H. R. MÜLLER, Limbach, Saxony. **Mercerizing knitted ware** in the flat. The goods drawn over the flat shapes are piled up and treated with lye in this position.

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26. PIGMENTS, RESINS, VARNISHES AND INDIA RUBBER.

A. H. SABIN, THEODORE WHITTELSEY.

Rust and Paints for the Preservation of Iron. F. MARGEVAL. *Mat. grasses*, 4, 2371–3. C. R. BRAGDON.

Fluid Rosin. ANON. *Papier Ztg., Seifensieder Ztg.*, 38, 1172.—When pine wood is subjected to sulfate cooking a yellow soap appears on the black lye. The fatty acids contain palmitic, oleic, linoleic and rosin acids. Both the wood and the soap contain phytosterol. A Swedish tariff report states that this thick dark brown fluid obtained as a by-product from the manuf. of cellulose, serves as a rosin substitute. The constants are acid no. 163.6, sapon. no. 173.0, unsapon. 9.6%. The mol. wt. of the acids, of which there are 89.4%, is 387. E. SCHERUBEL.

Chemical Investigation of Resin from the Pine (Picea excelsa). II. *l*-Pimaric Acid. J. KÖHLER. *Archiv. Kem. Min. Geol.*, 4, No. 5, 1–29; *J. Chem. Soc.*, 100, I, 295.—Pimaric acid, hitherto derived only from galipot resin, is here recorded as occurring invariably in the pines from Rottane (*Picea excelsa*) associated commonly with what are probably sapinic acids. A specimen, on recrystn. from MeOH, gave $[\alpha]_D^{20} = -280.5°$, and was found to conform to the formula $C_{20}H_{30}O_2$. Crystals showed an axial ratio of $[a : b : c = 0.80975 : 1 : 0.6102$. No definit m. p. is to be assigned, since on heating *l*-pimaric changes to a combination of inactive and *l*-rotatory colophonic acids, possibly one with the α-colophonic acids derived from sapinic acids. The active colophonic acids are not to be isolated by fractional crystn. being isomorphous members of the monoclinic system; inactive colophonic acid crystallizes, in the rhombic system like *l*-pimaric, with which, however, it is not isomorphous. With $[\alpha]_D^{20} = -83.3°$ the formula $C_{20}H_{30}O_2$ was derived for a colophonic acid. Colophonic acids are a transformation product resulting from the heating of naturally occurring resin acids such as *l*-pimaric and sapinic, from which they may be distinguished through their property of forming a gel on dilution of their alc. and NH_3 solns., with water. The following classification is given: *A. Natural Resin Acids*: (1) Pimaric acids. Do not oxidize in air, and are relatively stable on heating. (2) Sapinic. Readily oxidizable in air and are unstable on heating. *B. Colophonic Acids*. (1) α-Colophonic, *l*-rotatory. (2) β-Colophonic, *d*-rotatory. (3) Inactive. C. G. GILBERT.

Rubber Statistics for 1910–11. HECHT. *Elektrotechn. Z.*, 32, 1090. C. G. F.

The Constitution of Caoutchouc. LUFTENSTEINER. *Z. Oesterr. Apoth. Ver.*, 47, 249. J. J. M.

Determination of Filling Materials in Caoutchouc Mixings. J. MARCUSSON AND F. W. HINRICHSEN. *Caoutchouc & Guttapercha*, 8, 4853. — Aliphatic, aromatic ethers, particularly anisole and phenetole, can be used as solvents for vulcanized rubber at low enough temp. to sep. the more sensitive mineral fillers, Sb sulfide, etc., from solns. in their original condition. The sample is extracted with acetone, 1.0 g. put in weighed Erlenmeyer flask with 20-30 cc. anisole or phenetole and heated at 90–120° until soln. is completed and mineral matter has settled to bottom of flask; soln. is usually complete in 2 hrs. Benzine is then added, the whole centrifuged, the clear soln. poured off and residue shaken several times with benzine, then with alc. and ether. Finally the flask is dried at 105° and weighed. Good results are claimed for this method. W. W. EVANS.

Coefficient of Expansion of Caoutchouc. H. BOUASSE. *Caoutchouc & Guttapercha*, 8, 5286.—A theoretical paper from standpoint of thermodynamics. W. W. E.

Bromination of Vulcanized Rubber. W. A. CASPARI. *Caoutchouc & Guttapercha*,

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8, 5289.—C. prepared a series of vulcanized samples containing 1.23-28.40% combined S. The free S. was removed by acetone extraction. Extracted samples were brominated in CCl_4 with and without presence of I, and in hot and cold water according to Hübener's method. On bromination, the S of vulcanization is shared between the bromide and the liquid. In water the greater part passes into soln. as H_2SO_4, in CCl_4 more remained in the bromosulfide. The degree of bromination depends largely on the manner of operation. Bromination in water gives high results, due possibly to oxidation of the rubber. These bromides contained 5–60% sol. matter in cold acetone; those from CCl_4 about 1%. In order to have comparable results the procedure must be sharply defined. W. W. EVANS.

Thermal Phenomena in Caoutchouc. A. SCHWARZ AND P. KEMP. *Caoutchouc & Gutta-percha*, 8, 5293. — The authors discuss the relations existing between the temp. and extensibility of caoutchouc. W. W. EVANS.

Rosin (FAHRION). 27. Detection of Resin in Glazed Coffee (FELLENBERG). 12.

U. S., 1,005,623, Oct. 10. C. ELLIS, Larchmont, N. Y. **Shingle stain composition** comprizing Cu oleate, a drying oil, *e. g.*, linseed oil and a chlorinated naphthalene compd.

U. S., 1,005,818, Oct. 17. *Idem.* **Concrete and stucco paint oil** comprizing the Al soap of wood oil, Pontianac resin and a hydrocarbon solvent.

U. S., 1,005,953, Oct. 17. W. A. FREYMOUTH, London, Eng.; cf. *C. A.*, 5, 2979. **Treating lac** by heating lac wax and lac resin together until both are molten, mechanically mixing, and cooling the mixt. below the m. p. of all the ingredients until it becomes plastic.

U. S., 1,006,274, Oct. 17. N. REIF, Hanover, Ger. **Making a rubber substitute** by mixing S_2Cl_2 with linseed oil under high pressure, discharging the mixt. with a rotary movement and in tubular form from the mixing app. and simultaneously subjecting it to the action of an alk. soln. to reduce it to flake like condition.

U. S., 1,007,199, Oct. 31. H. P. HERMANN, Kronberg, Ger. **Composition for forming plastic wall coverings,** consisting of cement 154, plaster of Paris 30, sand 96 and powdered coloring matter. 30 parts, mixed with an adhesive consisting of resin 1 and dextrin 15 parts.

Brit., 25,201, Oct. 29, 1910. G. REYNAUD, 5 rue Salneuve, Paris. In the process of mfg. **india rubber** according to 25,087, 1910, turpentine oil, divided by means of an absorbent material such as unvulcanized rubber, is first of all treated with very dil. H_2SO_4, then successively with various dilns. of H_2SO_4 at progressive degrees of conc., and finally with H_2SO_4 of 60–66° Bé., the entire process being carried out in a cold state.

Brit., 26,870, Nov. 18, 1910. O. SHAW, Corbet St., Iron Works, Bradford, Manchester. **Smoking and coagulating rubber latex** by forcing the smoke through the latex by means of compressed air or gas.

Ger., 228,888, Sept. 5, 1909. A. WEBER, née Bentmann, Cöln a/Rh. Mfg. a **flooring.** One part of a filler is intimately mixed with 10–20 parts of flour or meal. An 8–12% soln. of viscose is added to the mixt. in such quantity that the resulting product has a suitable consistency. In order to unite it firmly with the supporting layer the latter and the lateral joint surfaces are painted with a 2-3% soln. of viscose mixed with flour.

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27. FATS, FATTY OILS AND SOAPS.

E. SCHERUBEL.

Rosin and its Determination in Fats. W. FAHRION. *Chem. Rev. Fett-Harz-Ind.*, 18, 239–42.—An American rosin showed an acid no. of 156.9. When the neutral soap soln. (60% alc.) was shaken out with petroleum ether, it yielded 8.3% "neutral bodies" with sapon. no. 169.7; and the soap soln. this time after diln. to 60% alc. yielded 7.1% "neutral bodies" to petroleum ether. Making allowance for the 7.1% the sapon no. becomes 182.7 and the mol. wt. 306.5 against 185.4 and 302 for pure abietic acid. The diff. is due to "oxyabietic acids" (mol. wt. 341–8). The diff. between 8.3 and 7.1% gives 1.2% "saponifiable neutral bodies" which F. considers as the anhydride of abietic acid. He adopts Bischoff and Nastvogel's formula for abietic acid which shows a double benzene ring with a carboxyl group in one of the rings and one double union in each of them. The carboxyl group cannot be esterized as shown by its behavior in the Twitchell method of detg. rosin. The so-called varnish esters prepared by heating rosin and glycerol are a mol. rearrangement. The following method is proposed for the detn. of free rosin acids in fatty oils: 5 g. of the oil are dissolved in 50 cc. petroleum ether and 20 cc. 96% alc. in a 250 cc. sep. funnel, and are titrated with *N* NaOH, using phenolph., to redness. Enough water is added to make a 60% alc. soln. and a drop of NaOH to restore the color. Allow to settle, draw off the red soap soln., add 1 cc. *N* NaOH and evap. to drive off all alc. Take up with water and in a sep. funnel shake out with ether and HCl; evap. the ether and the residue contains now free fatty and resin acids. To esterize dissolve in 20 cc. abs. alc., add in a sep. funnel 20 cc. petroleum ether and 1 cc. conc. HCl; if sepn. takes place after shaking add enough abs. alc. to make the soln. homogenous. Let stand over night, add phenolph. and titrate with *N* NaOH to redness; add enough H_2O to make a 60% alc. soln. The clear resin-soap soln. is shaken with petroleum ether to remove the traces of esters of fatty acids. The alc. is now evapd. and the resin acids are liberated with HCl and ether; the ether soln. is evapd. in a Pt dish and the resin acids weighed after drying 1 hr. on the H_2O bath. Control tests with known amts. of rosin in linseed oil gave slightly high results with low rosin content and slightly low results with high rosin content, varying from +1.29% to —0.20%; rosin itself showed 88.75% instead of 91.30% free acids, a diff. of 2.55%. To calc. the results back to the original rosin, allowance must be made for the unsapon. matter in rosin and in the oil, and F. considers it more rational to report the results not as rosin but as resin acids.

P. ESCHER.

Determination of Free Aliphatic Acids in Fats in Presence of Alkali Earth and Alkali Soaps. D. HOLDE AND J. MARCUSSON. *Z. angew. Chem.*, 24, 1945–8.—The method evolved is as follows: 10 g. of the fat are dissolved in 50 cc. of a mixt. of 9 vols. benzine and 1 vol. abs. alc. with the aid of heat and a reflux condenser. The soln. is filtered hot and washed with benzine alc. soln. The filtrate is shaken in a separatory funnel with 30 cc. of 50% alc. and the under layer titrated, using phenolph.

E. SCHERUBEL.

Determination of the Reichert-Meissl Number with Glycerol and Potassium Hydroxide. H. KREIS. *Chem. Ztg.*, 35, 1053–4.—Many samples of glycerol contain vol. fatty acids in sufficient amt. to give a R.-M. no. of 1.5. To avoid this the amt. of glycerol is reduced from 20 cc. in the Leffman-Beam method to 4 cc. and 2 cc. of 1 to 1 KOH. Comparative results with both methods show good agreement. The end of the sapon. is readily detected.

E. SCHERUBEL.

Determination of the Soap Content of Lubricating Greases. W. BOCKERMANN. *Chem. Ztg.*, 35, 1066.—The free fatty acids are first detd., then 2 g. of the fat are heated

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in an Erlenmeyer flask, having a reflux condenser, for ½ hr. with 50 cc. 0.1 *N* KOH and 50 cc. abs. alc. After cooling, 40 cc. of petroleum ether are added, the soln. shaken, and poured into cylinder and allowed to settle, after which 20 cc. of the ether soln. are drawn off into a weighed beaker and evapd. to constant wt. at 140°. This residue gives the unsapon. oil and the diff. between this and 100 the soap content. E. S.

Liquid Soaps. H. ROUSSET. *Mat. grasses*, 4, 2296–8. C. R. BRAGDON.

Stearin Soap for Finishing Cotton (ROUSSET). 25. Fat Content of Foods (NEUMAN). 12.

U. S., 1,005,733, Oct. 10. J. E. MILLS, Chapel Hill, N. C. **Apparatus for extracting oil from cotton seed, etc.,** comprizing an extraction chamber to hold a solvent heavier than the material from which oil is to be extracted, *e. g.*, CCl_4, a solvent inlet near the top of the chamber, an oil and solvent outlet near the bottom of the chamber, an inlet for the material between the solvent inlet and outlet, mechanism for periodically forcing the material through the inlet into the chamber, mechanism for withdrawing the material from the top of the solvent, and a shaft carrying paddles in the chamber.

U. S., 1,007,531, Oct. 31. O. CASSEL, Vienna. **In making crude oil soap,** adding montan wax to the soap before combining with crude oil; cf. *C. A.*, 5, 3177.

U. S., 1,007,642, Oct. 31. J. C. CHISHOLM, Dallas, Tex. **Refining crude cottonseed oil** by heating it and agitating it at a temp. of about 27° with an aqueous alk. silicate soln. until the acidity of the oil is overcome, maintaining the temp. of the mixt. at 24–32° until the sepn. of soap stock is apparent in the oil, adding an aq. soln. of alk. hydroxide, heating until the soap stock settles rapidly from the oil, and sepg.

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28. SUGAR, STARCH AND GUMS.

A. HUGH BRYAN.

The Status of the Sugar Industry. BARTENS. *Deut. Zuckerind.*, 36, 567–71.—A lecture. W. L. BADGER.

Report (LVI) on the Most Important Work in the First Half of 1911 on the Pure Chemistry of the Sugars. E. O. VON LIPPMANN. *Deut. Zuckerind.*, 36, 519–21, 535–6, 553–4. W. L. B.

Notes on Glucose Determination in Juices. WM. E. CROSS. *Louisiana Planter*, 47, 272.—C. recommends measuring out the raw juice by means of a pipet instead of weighing out, then dilg. and detg. the reducing sugars by titration. It is necessary, however, to know the Brix of the raw juice. Tables are given for facilitating the calculation. A. H. BRYAN.

Composition of American Commercial Glucose and Starch Sugars. A. HUGH BRYAN. *J. Frank. Inst.*, 172, 337–44.—The results of analysis of 28 samples of glucose and 18 samples of starch sugars (dextrose, climax and nabob) are given. The detns. made on com. glucose were: Polarizations direct at 20° and 87° and invert polarization at same temps., water, dextrose, ash. On the starch sugars were: Water, dextrose, dextrin (alcohol ppt.), ash and polarization. The methods used were described. A. H. BRYAN.

Direct Estimation of Sugar on Beet by the Sachs-Le Docte Method Using the Apparatus of Arm Le Docte. ANON. *Le Chimiste*, 2, 225–9, 246–9, 261–4, 281–5,

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293–5.—A description of the app. with cuts and method of detg. sugar in beet. Herzfeld's (*C. A.*, 3, 2249) modification is also given. A. H. BRYAN.

Notes on Sugar-house Analysis. W. E. CROSS. *Louisiana Planter*, 47, 305–6.—C. has prepared a table patterned after Schmitz's table for % of sucrose in cane juices when the Brix and polarization of the undiluted cane juice is known. Clarification is effected by the use of Horne's dry Pb. With this method no weighing is needed. About 100 cc. of juice is placed in a beaker and clarified with dry Pb, filtered and polarized. The % sucrose is taken from the table, corresponding to the Brix and polariscope readings of the juice. There is danger in using an excess of Pb for clarifying. Moisture can be detd. fairly accurately by drying the product in a dish without sand for 10 hrs. at 100°. Brix readings are too low for moisture and in heavy products such results may be many % too low. The refractometer method is recommended. A. H. BRYAN.

Factory Control. W. F. GAYMANS. *Arch Suikerind.*, 19, 1287–99.—The 3 most important formulas for factory control are: (1) Winter's, $W = (1.4—40/P_1)S$; (2) Hazewinkel's for factories with the defecation process, $W = 0.992S—(N—n + 0.008S)(R/100—R)—C—0.01h—0.10z$; (3) Hazewinkel's for factories with the carbonation process, $W = 0.963—S(N—n)(R/100—R)$; where w = recoverable sugar in cane, N = non-sugar in thick juice, n = non-sugar in the sugar, S = sugar introduced, h = amt. first sugar produced, z = amt. sack-sugar produced (all the above in % on cane), R = purity of molasses, P_1 = purity of raw juice, and C = correction for purity of raw juice (cf. *Ibid.*, 16, 316). These formulas are all derived from results obtained in practice. Theoretically, recoverable sugar = sugar in cane—sugar lost in scums—sugar lost in molasses. From this the following formulas are derived: (1) $W = S—f—(R/100—R)(n_1—n_2)$, or $W = (R_1—R)/(R_2—R) \times R_2/R_1 \times (100—f_1) \times S/100$; where n_1 = non-sugars in thin juice, n_2 = non-sugars in the sugar, R_1 = purity of thin juice, R_2 = purity of sugar, f = sugar in scums, % on cane, and f_1 = sugar in scums, % on sugar introduced. Sugar actually obtained in factories in Java in % of (*a*), the rendement by Hazewinkel's formula (based on actual practice), and (*b*) the theoretical rendement of G.'s formula are as follows: Av. of 13 factories with carbonation, *a*, 98.58, *b*, 94.66; av. of 30 factories with defecation, working on superior sugar, *a*, 98.69, *b*, 96.28; av. of 85 factories with defecation not working on superior sugar, *a*, 99.30, *b*, 97.80. The theoretical formulas are of value to show how far the factory is from perfect working, and to keep track of losses other than in scums and molasses. W. L. BADGER.

Saturation Values in Sugar Solutions and their Determination. H. CLAASSEN. *Deut. Zuckerind.*, 36, 554.—Polemic against an article by Koydl (*C. A.*, 5, 3524) and against his method of detg. the crystal content of sirups and massecuites in general (cf. *C. A.*, 5, 2344). W. L. BADGER.

Preliminary Purification of Raw Sugar Juices by the Menoscal Process. M. DESCAMPS. *Bull. assoc. chim. sucr. dist.*, 28, 859–61.—In this process the raw juice is first treated with Ca hydrosulfite in quantities of 5–10 g. per hecto of juice. The pectin substances are decomposed and the amt. of CaO to be added is reduced at least a third. A. H. BRYAN.

Relative Efficiency of a Six-roller Mill Compared with a Nine- and Twelve-roller Mill and Crusher. I. G. CHEQUELIN. *Louisiana Planter*, 47, 253.—A 6-roller mill with crusher gives an extraction of 76–78%, a 9-roller 82–83% and a 12-roller 84–86%. A. H. BRYAN.

High and Low Pressure Centrifugal Pumps and their Use in a Sugar Factory. A. BARTELS. *Deut. Zuckerind.*, 36, 757–8. A. H. B.

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The Sanborn Multiple Effect Evaporator. *Louisiana Planter*, 47, 240.—A description of the apparatus with cuts. A. GIVEN.

The Requirements of the Beet Sugar Factory as Compared with the Cane Sugar Establishment. ED. KOPPESCHAAR. *Intern. Sugar J.*, 13, 527.—A comparison of the equipment of cane and beet sugar factories and a description of beet factory appliances. A. G

A Mexican Sugar Hacienda, Cuatotolapam, Vera Cruz. *Louisiana Planter*, 47, 238.—A description of the estate which was established 7 years ago. A. G.

The Customary Methods for Selection of Beet Seed for the Estimation of Germination Power. A. HERZFELD. *Deut. Zuckerind.*, 36, 771. A. H. BRYAN.

The Leaf-louse Plague. A. WAGNER. *Deut. Zuckerind.*, 36, 555.—W. claims that the leaflouse can be entirely eliminated from a field of beets by burning S, placed on stakes $^1/_2$–$^3/_4$ m. high, at intervals between the rows; or by the use of liquid SO_2. The cost of the first method is given as 12–25 cents per acre; the second method is slightly more expensive. W. L. BADGER.

The Alteration and Adulteration of Gum Products. ANDRÉ GAUTIER. *Chimiste*, 2, 264.—The adulteration of com. gums is usually difficult to detect by chem. tests alone, and recourse must be had to their physical properties. Gum arabic is often adulterated with the exudation of the *Feronia elephantum*, a tree common in the East. A soln. of this gum contains twice the arabin of true gum arabic, and its comp. is very different. Tragacanth is sol. in H_2O, is pptd. by $Pb(AcO)_2$, but remains clear with borax and $FeCl_3$ solns.; these properties differentiate it from true arabic. It is pptd. by EtOH and thickens in $NH_4C_2H_2O_2$ solns. Tragacanth is often adulterated with Bassora and Caramanic gum. The former swells up to form a whitish mass in H_2O, which KI seps. into a watery liquid and a flocculent ppt., colored blue with I due to its starch. Caramanic gum is usually bleached and Pb salts can be detected in its solns. The presence of artificial gums, made usually from starch wastes, may be detected by the microscope. Glue is a more or less pure gelatin which should be neither acid or alk. The salts of Fe and Pb, and I and Br are without action on it. It gives a white ppt. with $SnCl_4$ and with $HgCl_2$, the latter sol. in excess of gelatin. Abundant gray flocks sol. in excess of gelatin and with heat in alkalies are obtained with tannic acid and all astringents. H. S. BAILEY.

Coagulum from Gelatin-Gum Sols. (TIEBACKX). 11. Application of Norway Saltpeter (KRÜGER). 15. Estimation of Malic Acid (YODER). 12.

U. S., 1,005,931, Oct. 17. H. BOSSE, Hecklingen, Ger. **Obtaining juice from beet roots** by disintegrating them, causing them to fall through steam, extracting the juice in a diffusion battery, pressing in the presence of steam and supplying the liquid extracted by the pressing operation to the diffusion battery.

U. S., 1,005,944, Oct. 17. W. J. DYER, Honolulu, Hawaii. **Sugar-juice filter.**

U. S., 1,006,311, Oct. 17. C. STEFFEN, Vienna. **Apparatus for continuously lixiviating saccharifierous plants, etc.**

U. S., 1,006,312, Oct. 17. *Idem.* **Treating potatoes** by slicing, partially extg. the starch from the slices by washing in a bath of initially prepared dil. potato juice, conveying this liquid, enriched with the starch, away from the slices and pptg. the starch therefrom, withdrawing the chips partially freed from starch from the bath and depriving them of surplus liquid and returning the liquid from which the starch has been pptd. to the washing bath.

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30. PATENTS.

Abstracts of patents are included under the foregoing divisions of the Journal. The abstracts of U. S. Patents are prepared by Earl T. Ragan, those of the British, French and German Patents by O. D. Swett and those of Canadian Patents by Russell S. Smart, of Fetherstonhaugh & Co., Ottawa (5 Elgin St.). The abstracts of French Patents are prepared, with permission, on the basis of the abstracts in *Moniteur scientifique*, those of German Patents, with permission, on the basis of the abstracts in *Chemisches Zentralblatt*.

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CHEMICAL ABSTRACTS

Vol. 6. JANUARY 20, 1912. No. 2

1. APPARATUS.

L. C. JONES.

Cut-off Slide. MISSONG. *Chem. Ztg.*, 35, 1190.—A gate valve which M. claims will not leak. Made by Schäffer & Budenberg, Magdeburg. J. H. MOORE.

Lead-covered Cock Plugs. ANON. *Chem. Ztg.*, 35, 1190.—The body of the plug may be made of any metal, the covering being Pb or other acid-proof material. J. H. MOORE.

Separatory Funnel for Quantitative Extraction. E. SHOWALTER. *Chem. Ztg.*, 35, 1180.—Two superimposed globes, the stem of the lower globe having the usual glass cock while in the neck between the globes is a 2-way cock through which the lighter liquid may be withdrawn. J. H. MOORE.

O. v. Mayer's Separable Water Catcher. ANON. *Chem. Ztg.*, 35, 1190.—It consists of 2 parts which clamp on the tube of the cooler, and are held together by springs. A piece of rubber tubing makes a tight joint between the tube and the H_2O-catcher. J. H. MOORE.

A Simple Hydrogen Sulfide Apparatus. E. R. HODGES. *Chem. News*, 104, 184.—Two conical flasks are connected with a short glass tube, having an oblique branch as delivery tube. Inverting causes acid from one flask to flow into another on the solid. H. V. MAIN.

Universal Extraction Apparatus. WALTER L. HALLE. Lab. L. Spiegler-Stiftung, Vienna. *Biochem. Z.*, 36, 245–7.—An elaborated, metallic Soxhlet app. D. D. VAN SLYKE.

Apparatus for Continuous Fractional Distillation. M. M. TIKHVINSKII. Org. Lab. Polytechn., Kiev. *J. Russ. Phys. Chem. Soc.*, 43, 806–8.—The arrangement consists of a glass dephlegmator filled with metallic beads, and the liquid, instead of being placed all at once in the distilling flask, is run in from the top drop by drop. To prevent the cracking of the hot dephlegmator by the drops of the cold high b. liquids, the app. for such liquids is modified so that the lower part of the tube through which the cold liquid is introduced is inserted into another tube having an opening in the side and sitting rather deep in the beads. The liquid is thus fore-warmed before it comes in contact with the hot dephlegmator. H. M. GORDIN.

Movable Electric Signal Thermometer. F. MICHEL. *Chem. Ztg.*, 35, 1111.—The principle of construction is similar to that of Beckmann's thermometer. To set it for any temp. the bulb is placed in an oil bath with an ordinary thermometer and slowly raised to the temp. above which it must not rize. When this is reached the contact wire in the capillary tube is pushed down to touch the Hg column. The other wire enters the bulb, and the wires lead to a bell, lamp, or magnet for closing the gas cock. J. H. MOORE.

A New Optical Pyrometer. ANON. *Met. Chem. Eng.*, 9, 615–6.—The light from a standard kerosene lamp is matched in intensity to that of the object seen in telescope. Readings accurate to 10° F. H. V. MAIN.

Some Recent Improvements in Pyrometers. R. S. WHIPPLE. *Electrician*, 68,

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132; cf. *C. A.*, 5, 2991.—Description of a new wire of an e. m. f. equal to that of Pt, which is employed in thermocouples. Comp. is not given. The change in resistance of the millivoltmeter with variations in temp. is eliminated by means of a bimetallic attachment which moves the scale of the galvanometer backwards and forwards, thus altering the position of the zero of the scale. A description with drawings of a scale control box and a thermocouple potentiometer is also given. G. F. YESSLER.

A Simplified Combustion Calorimeter. R. WRIGHT. Donald Currie Lab., The Queen's Univ., Belfast. *Chem. News*, 104, 201–2.—A simple students' calorimeter consisting of a weighted bell jar mounted on a brass plate, with tripod supporting a 1.5 in. crucible, all immersed in a beaker. H. V. MAIN.

The New Hinman Calorimeter. ANON. *Progressive Age*, 29, 744–5.—The Hinman calorimeter is of the same general design and operates on the same principle as the Junker calorimeter. C. A. COLE.

Mechanical Laboratory Sampler. ANON. *Mines and Minerals*, 32, 139.—A description and sketch is given of a sampler which automatically reduces large samples of 25–100 lbs. to a final sample of 6.75 lbs. The crushed coal is fed into the top of the sampler through a $^3/_4$ in. slot extending across 4 superimposed, inclined riffles. That coal which falls in the groove of the first riffle, being ½, slides down to a chute which deflects it upon the next riffle. The discard from each riffle is guided by another chute to the bottom, and out of the app. The final sample collects in a drawer at the bottom. C. A. COLE.

Thomas Gas Meter. H. N. PACKARD. *J. Ind. Eng. Chem.*, 3, 842–9.—Tests show conclusively that the theoretical grounds on which the meter design is based are correct, that the meter will operate satisfactorily on air, artificial gas and natural gas with widely fluctuating temps., pressures, and gas comp., giving readings directly in standard cu. ft. and that the accuracy of the meter is maintained for extended periods of time. C. A. COLE.

A Silica Standard of Length. G. W. C. KAYE. Nat. Phys. Lab. *Proc. Roy. Soc. London*, (*A*) 85, 430–47.—Fused silica has much to commend it for the constitution of permanent standards of length. Its coeff. of expansion is very low—lower than any other known substance except good quality invar—and it answers all requirements as to hardness, elasticity, d., and resistance to oxidation. In addition its thermal hysteresis has been found to be too small to be measured after temp. changes of over 100°. The SiO_2 standard meter constructed in the Nat. Phys. Lab. took the form of a tube 18.7 mm. in external diam. with walls 1.5 mm. thick. The ends of the tube terminate in semi-circular disks in which are ruled the reference lines. The end slabs were first coated on one side with a thin layer of Pt and the reference lines ruled with a diamond point. The lines are observed from the back by reflected light.
L. H. ADAMS.

Gasifying Coal. (STRACHE). 21. Determination of Gluten (ASPIT, BROCQ-ROUSSEN). 12.

U. S., 1,004,909, Oct. 3. P. A. ROSE, Chicago, Ill. **Acetylene generator.**

U. S., 1,007,909, Nov. 7. J. O. ANGERMEIER, Inglefield, Ind. **Acetylene generator.**

U. S., 1,008,049, Nov. 7. C. A. NICKLES, Ponca, Okla. **Acetylene generator.**

U. S., 1,008,058, Nov. 7. A. S. PHELPS and J. N. J. HILBERT, Chicago, Ill. **Acetylene generator.**

U. S., 1,009,119, Nov. 21. D. R. WAY, Fairfield, Iowa. **Acetylene generator.**

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Brit., 11,851, May 16, 1911. A. MERTENS, Cruybeke, Belgium. **An automatic gas analyzer** allowing of obtaining, after a given number of operations, a mean proportion between the vols. of gas absorbed and the vol. of gas treated, wherein a glass displacer combined with an absorber is actuated by a liquid flowing from a closed receptacle which is connected to a Mariotte vase and which communicates with the absorber in such a manner that the non-absorbed gases are sent into this receptacle, and the Mariotte vase furnishes a vol. corresponding to the vol. of gas displaced.

Ger., 229,527, Aug. 26, 1909. A. GUILBERT, Paris. **Acetylene gas generator** with cotton ring around the wick pipe.

Ger., 230,370, May 26, 1909. H. KNAPP, Weimar. **Cleaning** app. for **acetylene gas** in which the centrally introduced gas escapes through a cylindrical cleaning layer to the outside. A screw spring wound with wadding or similar porous cleaning means forms the layer, the windings of which can be contracted or extended with respect to each other by the change of the tension of the spring in order to regulate the gas flow through them and to remove from the porous layer the impurities sepd. from the gas.

Ger., 230,500, Oct. 12, 1909. H. A. WEIDMANN, G. m. b. H., Berg-Gladbach. **Acetylene apparatus** in which a regulation of the gas generation is effected by an increase of the water resistance in the water tank between generator and gas bell, the H_2O being thereby driven out of contact with the carbide.

2. GENERAL AND PHYSICAL CHEMISTRY.

JOHN JOHNSTON.

Recollections of Robert Wilhelm Bunsen. HANS GOLDSCHMIDT. *Z. angew. Chem.*, 24, 2137–40. E. J. C.

Applications of Physical Chemistry in the Preparation of Chemicals. L. WÖHLER. *Z. Elektrochem.*, 17, 617–22.—An address before the Bunsen Gesellschaft. J. HUNT WILSON.

Contributions to the Study of the Liquid State. I. An Expression for the Latent Heat of Vaporization. W. C. MCC. LEWIS. *Z. physik. Chem.*, 78, 24–38; see *C. A.*, 5, 3362. J. J.

High Temperature Gas Thermometry. ARTHUR L. DAY AND ROBERT B. SOSMAN; with an Investigation of the Metals by E. T. ALLEN]. *Publication No.* 157 of the Carnegie Inst. of Washington, pp. 1–129.—A detailed account of investigations, the main results of which have already been noticed (*C. A.*, 4, 851, 2398). J. J.

Metallogenic Classification of Simple Substances. L. DE LAUNAY. *Rev. gen. sci.*, 22, 633–44.—A discussion of a classification based on the mode of occurrence of the elements in nature, whether free, as constituents of silicates, etc., or as sulfides. G. W. MOREY.

Some Observations on the Theory of Tetrahedral Carbon. II. JOSÉ GIRAL PEREIRA. Salamanca. *Anales soc. españ. fis. quim.*, 8, 40–52.—A criticism of the present condition of the theory of the C tetrahedron in which are discussed such imperfections in the theory as the contradiction between the existence of labil forms and the implied checking of at. motion by double and triple bonds, the relative stability of compds. containing different numbers of multiple linkings, the question of supplementary valences, the conception of a purely formal, regular, indeformable tetrahedron to explain geometrical isomerism while enantiomorphism is interpreted by means of a deformable tetrahedron,

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the position of whose center of gravity is supposed to be influenced by the atoms or groups situated at its vertices, etc. H. S. PAINE.

Stereochemical Note. II. ANGEL DEL CAMPO Y CERDAN. *Anales soc. espaü. fis. quim.*, 8, 132–41.—A defense of the present condition of the theory of tetrahedral C and a reply to the above. H. S. PAINE.

Some Conditions Affecting Chemical Change. W. A. B. W. *Chem. News*, 104, 175–7.—Speculative. The author factors at. energy into the components, at. motion and at. attraction, and discusses the various cases possible. G. W. MOREY.

Dielectric Cohesion of Rare Monoatomic Gases. E. BOUTY. *Ann. chim. phys.*, 23, 5–28.—The gases studied were purified by repeated fractional distillation in the presence of charcoal cooled by liquid air. The dielec. cohesion (y in the formula $y = a + bp$, in which y is the minimum p. d. at which the gas conducts at the pressure p) for He was found to be 18.3 at 17°. With Ne the lowest value obtained after a series of fractionations was 6.1; B. calcs. that of the pure gas to be 5.6. The detn. in the case of A was difficult, due to variations in a. The mean value obtained was 38. The effect of small quantities of air and CO_2 on the dielectric cohesion of Ne and He was detd. GEORGE W. MOREY.

Dielectric Constants and Conductivity of Rocks. HEINRICH LÖWY. Göttingen. *Ann. Physik*, 36, 125–33; cf. *C. A.*, 6, 64.—L. has recently expressed the opinion that down to great depths the earth conducts elec. waves (*Physik. Z.*, 11, 697 (1910)). The data upon which the opinion was based were those found in the literature and were to a certain extent unreliable. New measurements of dielec. consts. and conds., with carefully selected samples of rocks, have now been made, with results which, in general, confirm the former conclusion. L. H. ADAMS.

Some Thermodynamic Properties of Air and of Carbon Dioxide. A. G. WORTHING. *Physic. Rev.*, 33, 217–67.—A discussion of the dependence of the ratio $\gamma(= c_p/c_v)$ of a substance on its pressure and temp. W. used existing data for air, but detd. γ for CO_2 experimentally by the method of Maneuvrier. An expression was developed which shows the relation between γ and the free expansion effect, η. From existing data he has computed values for the free expansion effect η, the Joule-Kelvin effect μ, and the ratio of the internal work to the external work for infinitesimal reversible isothermal expansion $\Delta\omega_1/\Delta\omega_2$ for air at 0° and 79.3°, and for pressures up to 130 atm. Values of γ for CO_2 have been obtained experimentally at 0°, 31.0°, 50.0° and 98.5° and for pressures ranging from about 8 to 57 atm. The approx. constancy of a new function where γ' is defined by $pv^{\gamma'} =$ const. for CO_2 has been pointed out. Values for c_p, c_v, μ, η, and $\Delta\omega_1/\Delta\omega_2$ for CO_2 at 0°, 30°, 50° and 100°, and for pressures up to 90 atm., have been computed. The results of the present work are in good agreement with the experimental results of others. Certain characteristics of the expansion of air and CO_2 through a porous plug and into a vacuum are discussed. J. L. CRENSHAW.

The Condensation of Vapors. F. BECKER. Inst. physik. Chem., Göttingen. *Z. physik. Chem.*, 78, 39–70.—The minimal pressure necessary to condense fog particles from the vapors of substances at temps. below the m. p., was detd. The condensation was detected by viewing a point in the gas at which the light from a gas burner was focused by a lens. It was found that the vapors of substances whose liquid phase can be greatly undercooled (Class I) condense at first as drops of liquid, while in other cases (Class II), crystals are formed immediately from the vapor. The minimal depression of the pressure necessary for fog formation decreases with increasing temps. for vapors of Class I, and increases for vapors of Class II, so that the condensation to drops of liquid results the more easily the more dense the vapor, while the same

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condition makes the condensation to the crystal form more difficult. From the necessary minimal depression of the pressure, the undercooling and the partial pressure of the vapor were detd. The phenomena observed were found, in the case of I_2, to be complicated by the disappearance of the color of the vapor, which is caused by a depression very much smaller than that necessary to produce visible crystals. When centers of crystn. are formed from any of the vapors these continue to grow larger, and the crystals increase in size more rapidly as the conc. of the vapor and as its speed increases. Contact with smooth glass walls has no noticeable effect upon the undercooling necessary for drop formation. For temps. as low as —4° and depressions as great as 400 mm., drops of water, and not crystals of ice, are formed.

W. D. HARKINS.

Molecular Attraction and the Properties of Liquids. R. D. KLEEMAN. *Phil. Mag.*, 22, 566–86.—A theoretical discussion of the general relations between internal heat of vaporization, surface tension, d. and other physical properties of closely related substances.

ROBT. F. EARHART.

Specific Heat of Water. ANDRÉ COTTY. *Ann. chim. phys.*, 24, 282–8.—The sp. heat of H_2O was detd. at 2° intervals between 0 and 35°, using the method of mixts.; temps. were measured by means of thermoelec. couples. The results agree closely with those of Bartoli and Stracciati; a minimum value was found near 21°.

H. S. PAINE.

Relation of Heat of Vaporization to other Constants at the Boiling Temperature of Some Liquids at Atmospheric Pressure. J. P. MONTGOMERY. *Am. Chem. J.*, 46, 298–307.—From the existing data on unassociated liquids M. finds the following relations to hold: (I) $(v-V)/\lambda = C_1$, where v and V are the vols. of 1 g. of liquid and vapor, resp., λ is the heat of vaporization, and C_1 is a const.; (II) $S^2/\lambda = C_2$ where S is the speed of the mols. at the b. p.; (III) $H/nT = C_3$ where H is the heat necessary to vaporize unit vol. of the gas from the liquid, n is the relative no. of mols., and T is the abs. temp.; (IV) for isomers, the d. at the b. p. divided by the b. p. (abs.) is a const.; (V) $bT/M\sqrt{m} = C_4$ where b is the mol. vol. of van der Waals' equation, and m is the no. of atoms in a mol. These relations are found to hold closely though variations are found in the case of (V), where, however, the data are more uncertain. From these M. decides that the heat of vaporization is the energy absorbed in overcoming cohesion and in increasing the kinetic energy of the mols., but is not involved in intramol. work.

D. A. MACINNES.

The Simple Direct Determination of the Heat of Vaporization of Liquids. N. NAGORNOV AND L. ROTINYANZ. *Z. physik. Chem.*, 77, 700–6.—The heats of vaporization of a number of organic liquids were detd. by a method which is a simplification of that used by Marshall and Ramsay (*Phil. Mag.*, 41, 38 (1896)), in which the vaporization was accomplished by means of the heat developed by a measured elec. current and the amt. vaporized weighed directly. The following values are expressed in cal. per g. substance: Benzene, 93.9; toluene, 86.2; *m*-xylene, 82.3; *p*-xylene, 81.1; *o*-xylene, 82.5; chlorobenzene, 75.9; bromobenzene, 57.9; cyclohexane, 85.4; methylcyclohexane, 76.4; chlorocyclohexane, 74.9; cyclohexanol, 108.1; Et-*n*-propyl ether, 82.7; Et isobutyl ether, 74.9. Each value is a mean of from 2 to 5 detns. which vary from the mean by not more than 0.5%. All except cyclohexanol follow Trouton's law: $LM/T = K$, (L = heat of vaporization, M = mol. wt., T = abs. temp., and K = const.).

D. A. MACINNES.

Crystallin Liquids. H. VON WARTENBERG. Phys.-chem. Inst., Univ. Berlin. *Physik. Z.*, 12, 837–9.—When in the turbid state, *p*-azoxyanisole and *p*-azoxyphenetole behave in a magnetic field as uniaxial crystals, a behavior which supports the Bose

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"swarm" theory. The transition point (to clear liquid) is not affected by a magnetic field; this is in accordance with theoretical considerations (cf. Nernst, *C. A.*, 5, 2014). J. JOHNSTON.

Researches on the Freezing Point of Organic Liquid Compounds. J. TIMMERMANS. Lab. chim. gén., Univ. Brussels. *Bull. soc. chim. belg.*, 25, 300–26.—T. has detd. the f. ps. of about 60 org. compds., liquid at ordinary temp., with an accuracy of 0.1°. A temp. scale extending to —125° was established by the use of a Pt resistance thermometer, suitable reference pts. being taken and the final scale selected after comparison of the interpolations made according to Travers, Onnes and Ostwald. A no. of liquid thermometers (toluene, pentane, isopentane, Et_2O, etc.) calibrated from the Pt resistance thermometer were used in the actual f. p. detns. T. discusses the precautions necessary in the construction and use of liquid thermometers for precise measurements at low temps. Solid Et_2O was found to be dimorphous, the stable form freezing at —116.2° and the unstable one at —123.3°. H. S. PAINE.

Measurements of Specific Heats at Low Temperatures with the Copper Calorimeter. F. KOREF. Phys. Chem. Inst., Univ. Berlin. *Ann. Physik*, 36, 49–73.—Sp. heats were detd. by a method already described (*C. A.*, 4, 2396), which is described again in somewhat more detail in the present paper. The following substances, for certain temp. intervals (given in parentheses), have the following mean at. or mol. heats: Al, (—190 to —82), 3.97; Cu, (—190 to —83), 4.57; (0 to —77), 5.59; Zn, (—190 to —82), 5.16; Hg solid, (—42 to —77), 6.58; Hg liquid, (—36 to —3), 6.68; Li, (—191 to —80), 3.61; (0 to —78), 5.15; (+19 to —75), 5.44; Na, (—191 to —83), 5.60; (0 to —77), 6.34; K, (—191 to —80), 6.14; (0 to —78), 6.51; B, (—191 to —78), 0.778; (0 to —76), 1.843; Acheson graphite, (—191 to —79), 0.688; (0 to —76), 1.506; (—80 to —4), 1.485; diamond, (—79 to —3), 0.864; Br solid, (—191 to —81), 5.63; NaF, (—191 to —82), 7.31; (0 to —75), 10.43; $NaCl_4$ (—188 to —81), 9.73; (0 to —75), 11.52; NaBr, (—191 to —82), 10.44; (0 to —76), 12.04; NaI, (—192 to —81), 11.10; (0 to —77), 12.14; KF, (—192 to —82), 9.06; (0 to —76), 11.21; KCl, (—192 to —81), 10.50; (0 to —77), 11.78; KBr, (—191 to —82), 10.84; (0 to —77), 12.20; KI, (—191 to —80), 11.17; (0 to —77), 12.21; CaF_2, (—190 to —84), 9.69; (0 to —73), 14.90; CaO, (—188 to —80), 5.62; (0 to —78), 8.97; $CaCO_3$, (—191 to —81), 12.05; (0 to —78), 17.24; $Ca(OH)_2$, (—191 to —80), 11.30; (0 to —78), 17.53; (+18 to —73), 18.41; AgI, (—191 to —82), 11.40; (0 to —78), 12.52; PbI_2, (—191 to —81), 18.74; SiO_2 (amorphous), (—193 to —79), 5.32; (0 to —76), 8.87; SiO_2 (rock crystal), (—193 to —79), 5.30; (0 to —77), 8.81; CS_2, liquid, (0 to —76), 18.01; (+18 to —74), 18.08. Instead of at. or mol. ht., mean specific heat will now be given: Glass, (+31 to +1), 0.1895; (—77 to —3), 0.1623; paraffin, (+29 to +1), 0.775; (+18 to +1), 0.532; (—76 to —1), 0.372. The heat of fusion of Hg at —38.7° is 571 cal. By a simple modification the mol. heat of vaporization of CS_2 at 14.1° was found to be 6614 cal. The theoretical interpretation of the results from the standpoint of the Nernst-Lindemann modification of the Einstein sp. heat formula (*C. A.*, 5, 2764) and the Nernst heat theorem is postponed to a future paper. The observed at. heats of Li, Na, B and Br are found to agree roughly with the results calc. by the modified Einstein formula, using values of vibration frequencies (ν) calc. by Lindemann's formula (*C. A.*, 4, 2593). Using values of ν deduced from Rubens measurements of the residual rays (Reststrahlen) (*C. A.*, 4, 1420), a rough agreement between observed and calc. mol heats is found for NaCl, KCl, KBr, KI, CaF_2. Therefore, the vibrations which produce the optical effects must be identical with those responsible for the heat capacity. Since, according to the electromagnetic theory of light, only vibration of electrically charged bodies can produce light, it follows that only vibrations of charged bodies contribute sensibly to the heat capacity. In the cases of $CaCO_3$ and SiO_2 there is no such agreement,

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which indicates that in these cases there are also vibrations of uncharged bodies which contribute sensibly to the heat capacity. GRINNELL JONES.

The Energy Content of Solid Substances. W. NERNST. Univ. Berlin. *Ann. Physik*, 36, 395–439; cf. *C. A.*, 4, 2397, 3159; 5, 1012, 2763, 2764, 2765.—The new experimental method for the detn. of sp. heats at low temps. is described in more detail than in any previous paper, especially in regard to the calibration of the Pt resistance thermometer. The following new data are given (together with others previously published). The at. or mol. heat capacities in cal. per degree, corresponding to the abs. temp. which these values follow, for various substances are resp.: Pb, 273°, 6.27; 202, 6.23; 198, 6.27; 193, 6.02; 101, 5.75; Ag, 208, 5.92; 200, 5.73; 86, 4.40; 66, 3.66; Zn, 274, 5.90; 207, 5.83; 94, 4.55; 89, 4.39; 85, 4.24; 80, 4.17; 75, 3.95; 68, 3.59; 64, 3.51; 61.8, 3.25; 43.7, 2.17; 36.3, 1.71; 34.3, 1.32; 33.1, 1.25; S (rhombic), 84.8, 2.84; 69.0, 2.29; 57.0, 2.06; 29.9, 1.14; 28.3, 1.08; 27.5, 1.04; 25.9, 0.99; 22.6, 0.96; KBr, 89.2, 10.05; 85.4, 9.64; 82.5, 9.51; 78.7, 9.48; ½KCl, 290, 6.02; Acheson graphite, 87.5, 0.32; 82.5, 0.29; 58.8, 0.14; 44.1, 0.10; 38.1, 0.07; 28.7, 0.06; AgI, 79.8, 10.17; 75.5, 9.70; 30.6, 5.95; 30.0, 6.08; 29.0, 5.51; quartz crystals, 92.6, 3.39; 89.0, 3.25; 84.3, 3.03; 36.1, 0.794; 31.2, 0.527; 28.75, 0.52; 25.8, 0.416; I, 80.4, 5.36; 73.7, 5.40; 36.5, 4.17; 33.5, 3.97; 28.3, 3.78; AgCl, 88.7, 9.69; 85.3, 9.79; 45.6, 7.25; 32.8, 4.79; 26.4, 3.44; 23.5, 2.98; quartz glass, 84, 3.14; 42.6, 1.33; 35.2, 0.844; 29.4, 0.644; 26.25, 0.637; $PbCl_2$, 87.7, 13.55; 84.4, 13.37; 63.1, 11.71; 59.9, 11.75; 54.9, 10.46; 27.0, 4.88; 24.0, 3.50; 19.8, 3.08; 15.6, 2.16; benzene, 200.9, 1.728; 197.7, 1.678; 80.7, 0.95; 53.45, 0.694; 46.75, 0.611; 40.85, 0.578; 36.1, 0.520; 34.3, 0.451; 31.1, 0.386; 27.8, 0.348; 24.4, 0.224. A great decrease in heat capacity at low temp. has been found for all substances studied. Especially noticeable is the fact that graphite has higher heat capacity than diamond (see *C. A.*, 5, 2765) and quartz glass higher than crystallized quartz. The comparison of these results with theoretical formulas is similar to that already published (see *C. A.*, 4, 3159; 5, 2764; and preceding abstr.). The energy content of a solid at ordinary pressures is given by the formula:

$$W = 1.5R\Sigma[\beta\nu/(e^{\beta\nu/T} - 1) + \beta\nu/2(e^{\beta\nu/2T} - 1)] + 3aT^{4}/5.$$

The chief new theoretical result is: "All measurements and theoretical considerations agree that even before the abs. zero is reached, the heat capacities of elements and compds. becomes vanishingly small; from this it follows that all properties of solid (either crystal or supercooled liquids) so far as they depend on the mean behaviors of the atom, at low temps. must become independent of the temp. Such properties are the energy content, vol., compressibility, etc., and the thermodynamic functions, chem. potential, free energy, etc." The Nernst heat theorem is a special case of a more general law. GRINNELL JONES.

The Change of Electrical Resistance of Iron with Temperature from 0-1000°. ALFRED R. MEYER. Berlin. *Ber. physik. Ges.*, 1911, 68–93.—Measurements of the resistance coeff. of Fe have been made by a number of investigators, but in the majority of cases the Fe which was used was far from pure. M. has measured carefully the change of resistance from 0–1000° of very pure Fe from 3 different sources. The metal was used in the form of a wire which was sealed in a glass tube. The tube was evacuated and the wire heated electrically. From the current and the p. d. across the wire the resistance was calc. Temps. were measured with a Pt–PtRh thermocouple. The resistance temp. curves show a point of inflection at about 700°. The resistance in ohms(σ_0) per m. and sq. mm. of Kahlbaum's Fe (containing 0.015% SiO_2, 0.001% Mn, 0.004% Cu, and 0.004% Ni) was found to be 0.085. The coeff. of resistance from 0° to 100° in terms of the resistance at 0°, α, was 0.0082. For electrolytic Fe (for which C = none, Cu = none, S<0.008%, Mn = none, Si = none, P = 0.007%) σ_0 =

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0.093; α = 0.0065$_7$. A third sample of Fe containing 99.94% Fe gave for σ_0, 0.095; for α 0.00607. L. H. ADAMS.

The Melting Point and the Atomic Vibration Number of Germanium. W. BILTZ. *Z. anorg. Chem.*, **72**, 313–8; cf. *C. A.*, **5**, 3745.—In order to calc. the vibration numbers for Ge its m. p. was detd. Two samples were used. On account of the small amt. of material the melting curve could not be taken. The Ge was put into a porcelain tube provided with a glass window; when it was seen to melt the temp. was read off by means of a thermoelement. If any O is present the GeO_2 formed dissolves in the Ge and lowers the m. p. Ge melts very sharply in H or in N after any oxide has been reduced by heating in H. The m. p. of Ge in H is 958 ± 5°; when satd. with GeO_2 it is 916 ± 5°. The vibration no. is calc. to be 3.7 instead of 3.5 as previously taken. This does not change the relative position of Ge in the system of vibration numbers, which shows this element paired with As, as homologs of the pairs Sn, Sb, and Pb, Bi.
J. L. CRENSHAW.

The Specific Conductance of Fused Potassium Nitrate. A. H. W. ATEN. Univ. Amsterdam. *Z. physik. Chem.*, **78**, 1–23.—For measuring temps. a Callendar resistance thermometer was used; this was standardized by the "thermodynamic" scale of Holborn and Henning. Detns. were made in Thuringian and in Jena (59^{III}) glass, and in quartz. The values obtained for the sp. cond. are lower than those obtained by Goodwin and Mailey, and at 340° are about the same as those given by Lorenz and Kalmus. However the values obtained by the latter are very much lower at 400°. The mean value of the sp. conds. was found to be 0.6347 at 340°, and 1.1078 at 500°.
W. D. HARKINS.

The Conductance of Electricity through Salt Vapors. G. C. SCHMIDT. Münster i. W. *Ann. Physik*, **35**, 401–43; cf. *C. A.*, **5**, 233.—An account of further work on the subject. The conclusion is reached that the vapors of the halogen salts of Zn, Cd, Fe, Al and NH_4 conduct electricity while those of Hg, Sn, As and also all org. substances are nonconductors. The cond. of Cd salts decreases with time until a const. value is reached; that of the other salts first increases, then reaches a max., and falls to a const. value. Neither H_2O, O, nor the presence of radioactive substances is the cause of the formation of ions. The cond. rizes rapidly with increase of temp and with decreasing pressure. L. H. ADAMS.

The Electrical Conductivity of Salts and Salt Mixtures. A. BENRATH AND J. WAINOFF. Königsberg. *Z. physik. Chem.*, **77**, 257–68.—In continuation of previous work (*C. A.*, **3**, 610) on the cond. of cryst. salts and salt mixts., the authors have studied a number of other salt pairs, *viz.*: KCl-HgCl, KCl-NaCl, KCl-K_2CrO_4. The relation between the elec. cond. K and the temp. t of the single salts in the solid state follows the law: $\log K = a + bt$, a and b being consts. The form of the cond. isotherms of a salt mixt. was found to be dependent on its constitution. As regards their elec. cond., salts and salt mixts. behave in a manner exactly opposit to metals and alloys.
L. H. ADAMS.

Tantalum, Tungsten and Hydrogen. A. SIEVERTS AND E. BERGNER. Univ. Leipzig. *Ber.*, **44**, 2394–2402; *C. A.*, **2**, 2480; **4**, 137, 1951.—The solubility of H in Ta was observed at temps. ranging up to 1330°; at this temp., the amt. of H dissolved is proportional to the square root of the gas pressure.. At const. pressures of H, the solubility diminishes with increasing temp. When Ta is heated to redness in H, its structure is changed and remains changed, even after the H has been removed by heating the metal in a vacuum. N reacts slowly above 900° with Ta forming the nitride. At 1500° W dissolves H in very small quantities, but shows no reaction with N.
LILLIAN COHEN.

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An Application of Kirchhoff's Equation to Solutions. (The Thermodynamic Theory of Solubility.) R. T. HARDMAN AND J. R. PARTINGTON. Chem. Dept., Univ. Manchester. *J. Chem. Soc.*, 99, 1769–75; *Proc.*, 27, 221.—The equation deduced by van't Hoff (*Kongl. Svenska. Akad. Handl.*, 21, 38 (1885)), as a general differential equation for a satd. dil. soln., was integrated by him on the assumption that the heat of soln. may be regarded as const. over a small range of temp. The equation thus obtained has proved satisfactory in a limited field; the present writers seek to make it more general by combining it with Kirchkoff's theorem that the rate of increase of the heat of reaction, taken positive for heat absorbed, with the temp. at which a reaction proceeds, is equal to the total heat capacity of the system of products minus the total heat capacity of the system of initial substances. The final equation obtained is: $\text{Log } s = A - B/T - C \log T$, where A is an arbitrary const., and s is the solubility in g. per 100 g. solvent. This equation is exactly analogous to the vapor pressure equation deduced by Kirchhoff, and also by Rankine and Dupré. No assumptions are made as to the condition of the solute, nor are the equations taken to imply any similarity between the state of a solute and that of a free gas. "The real fundamental proposition of the thermodynamic theory of soln., is contained in the assertion that the osmotic pressure of a soln., and every other property conditioned solely by it, depend simply on the number of solute mols. scattered through a given vol. of soln., and not at all on the chem. nature of either solute or solvent, or on the relation between the latter, provided only that the soln. is dil." The chem. properties of solns. however are conditioned by the relationship between solute and solvent. W. D. HARKINS.

The Vapor Pressure and Integral Heat of Solution of Saturated Solutions. A. SPERANSKII. Physik-Chem. Lab., Univ. Kiev. *Z. physik. Chem.*, 78, 86–109.—The differences in the vapor tensions of the pure solvents and of the following solns. were detd. in a tensimeter: Acetanilid in $CHCl_3$, *m*-dinitrobenzene in C_6H_6 and in $CHCl_3$; and $BaCl_2$, KNO_3, $KClO_3$, $K_2Cr_2O_7$, $Na_2S_2O_3$, Na_2CO_3, $CuCl_2$, oxalic acid, and succinic acid in H_2O. From these differences the vapor tensions of the satd. solns. were calcd. for temps. from 20° to 60°. Only in the case of $Na_2S_2O_3$ was there a decrease in the vapor tension of the satd. soln. with the temp. The ratio p/P (p and P are vapor pressures of soln. and solvent, resp.), decreases with the temp. for all substances except $Na_2CO_3.H_2O$. Bertrand's formula, $p = Kn(T-\lambda)/T$, is valid not only for aq. solns., but also when $CHCl_3$, C_6H_6, or NH_3, is used as the solvent. Here k, n and λ are consts. For a soln. of $CuCl_2.H_2O$ another formula ($p = k.10^{-\lambda/T}$) is found to apply. On account of the analogy between vaporization and soln. it might be expected that Bertrand's formula would be suitable for the purpose of detg. the change of solubility with the temp.; this is found to be the case. For other relationships the original paper should be consulted. The writer draws the conclusion that the integral heat of soln. is very nearly const. W. D. HARKINS.

The Dependence of the Integral Heat of Solution upon the Temperature. A. VOITASHEVSKII. Univ. Kiev. *Z. physik. Chem.*, 78, 110–22.—V. attempted to apply Kirchhoff's equation, $l = T^2 d\ln(p_0/p)/dT$, to det. the variation of the "integral" heat of solution (l) (that is the heat involved in the satn. of 1 mol. of the solvent with the saturating salt) with the temp., but found that p_0/p varied in such an irregular way that the results were not satisfactory. Better results were obtained by the use of interpolation formulas. All formulas which express accurately the change of the vapor pressure of a pure liquid with the temp., are also applicable to the satd. solns. The conclusion is reached that l must decrease as the temp. increases, while Speranskii (preceding abstr.) concludes that l is const. W. D. HARKINS.

Crystallization and Solution in Aqueous Solutions. M. LE BLANC AND W. SCHMANDT. Leipzig. *Z. physik. Chem.*, 77, 614–38.—In recent years, the question of the rate of

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crystn. and soln. has been the subject of much controversy, and opinion has been divided as to whether or not the velocity with which these processes take place is conditioned by diffusion. Careful measurements at various temps. have been made of the rate of dissolution and of crystn. of K_2SO_4, $K_2Cr_2O_7$ and $NaClO_3$. In each case the velocity of soln. follows the laws of diffusion; the crystn. velocity on the other hand does not do so. The exception is $NaClO_3$, which at high temps. shows equal crystn. and soln. velocities. Expts. were conducted which indicated a different solubility for the different faces of a crystal, but further investigation is necessary before a definite answer to this question can be given. L. H. ADAMS.

A Chemically Passive Unpolarized Electrode. M. LEBLANC. Leipzig. *Z. Elektrochem.*, 17, 677–9.—Electrodes of Na amalgam in 0.2 *N* NaOH were found by the oscillograph to be practically unpolarizable. H is evolved from such electrodes only very slowly, although it can be calc. that H at 10^{20} atm. would be in equil.; the electrode must, therefore, be considered chemically passive. Hence this is an exception to the general rule that chem. passivity and elec. polarization are found together. GRINNELL JONES.

The Permeability of Porcelain and Copper Ferrocyanide Membranes. F. E. BARTELL. *J. Physic. Chem.*, 15, 659–74.—The relation between the pressure and the amt. of water passing through porcelain and $CuFe(CN)_4$ membranes was detd. in an app. in which pressures up to 6000 mm. Hg could be obtained and the water could be measured to 0.1 cu. mm. Poiseuilles' law, *i. e.*, the amt. passing is directly proportional to the pressure, was shown to hold for all the membranes studied. An apparent exception in the case of the porcelain membranes was found to be due to a mechanical change in the material. The fact that Poiseuille's law holds for $CuFe(CN)_6$ membranes shows that it must be valid for pores of mol. dimensions. Under const. pressure the amt. of water passed at different temps. between 20° and 70° was found with all the membranes studied to vary with the fluidity of the water. D. A. MACINNES.

Thermal Analysis in Quaternary Systems. II. N. PARRAVANO AND G. SIROVICH. Ist. chim. r. univ. Roma. *Atti accad. Lincei*, 20, II, 331–7.—Continuation of *C. A.*, 6, 16. CHAS. A. ROUILLER.

Homogeneous Allotropy in a Pseudo-ternary System. The Unary Trimolecular System: Acetaldehyde, Paraldehyde, Metaldehyde. A. SMITS AND H. L. DE LEEUW. Univ. Amsterdam. *Z. physik. Chem.*, 77, 268–83; see *C. A.*, 5, 1862. J. J.

The System: Acetaldehyde, Ethyl Alcohol. H. L. DE LEEUW. Amsterdam. *Z. physik. Chem.*, 77, 284–314; see *C. A.*, 5, 1862. J. J.

Experimental Confirmation of the New Theory of the Phenomenon Allotropy. II. A. SMITS AND H. L. DE LEEUW. *Z. physik. Chem.*, 77, 367–79.—Additional data in confirmation of Smits' theory of allotropy (*C. A.*, 5, 1861). Very pure white P was prepared by distillation *in vacuo* and fractional crystn., being finally distilled into a glass tube containing a Pt resistance thermometer and sealed off. This P, when held for 2 days at 43° and then plunged into a 50° bath, began to melt at 43.96° and had a m. interval of only 0.02°. This may be considered a unary m. temp. The same P was left for 24 hrs. at 40° and then put into the 50° bath; m. began at 43.92° and there was an interval of 0.04°, the difference being due to the fact that the inner equil. had been established 4° lower than in the first case and the heating was so rapid that the inner equil. could not follow the temp. The P tube was held some time at 46° and then allowed to cool in the air. Just below the m. p. the melt was seeded; the temp. rose to 43.89°. Although there was a freezing interval of 0.05°, the P is considered to be almost in the unary condition. The P was heated to 100° and then put suddenly in a 15° bath; the melt was seeded above 44° and the temp. rose as high as

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46°, then fell off rapidly. The entire cooling curve is like that of a mixture. On remelting an interval of 0.13° was observed, showing that the inner equil. was quite different, and that in these cases P acts like a binary system. The authors give the general form of the T—x diagram of the system αP, βP, though no points were detd. By this diagram it is shown how a third modification of P observed by Jolibois may be accounted for without considering the system a ternary one. Detns. of the m. p. of Hg show that it is always unary whether it is cooled rapidly from 300° or heated rapidly from —80°. There is never a m. interval of more than 0.02°, showing that Hg probably exists in only one kind of mol. J. L. CRENSHAW.

Relation of Vapor Pressure to Specific Gravity in Binary Liquid Mixtures. A. G. DOROSHEVSKII. *J. Russ. Phys. Chem. Soc.*, 43, 656–70.—D. compared the observed deviations (dp) of the vapor pressure of binary mixtures in different concs. from the values calc. on the assumption that the pressures are represented by a straight line, with the observed deviations (dv) of vol. contraction from contraction values also calc. on the basis of the straight line assumption. The mixtures examd. were: MeOH + EtOH, PrOH + H_2O, C_6H_6 + CCl_4, AcMe + H_2O, $C_2H_5(OH)_2$ + H_2O, EtOH + H_2O. Following conclusions are drawn; Kuenen's statement that the vapor pressures of the mixture, MeOH + EtOH, can be represented by a straight line (Kuenen, "Theorie d. Verdampfung u. d. Verflüssigung," 1906, 137) is incorrect. On the basis of Haywood's data (*J. Am. Chem. Soc.*, 21, 996) it is shown that there is a const. difference of 29 mm. between the experimental and the straight line values for this mixture. In general the curves for dp and dv are very similar: When dp = 0, dv = 0; when dp = const., dv = const.; when dp has a max. or minimum, dv also has a max. or min. For the mixture of EtOH + H_2O the relation between vapor pressure and vol. contraction can be represented by the equation, $p = p_1c_1 + p_2c_2 + kdv$, in which p is the pressure of the mixt., p_1 and p_2 that of the components, c_1 and c_2 their conc., dv the vol. contraction, and k a const. independent of conc., varying only with the temp. The values of k at 15, 20 and 30° are resp. 2.4, 3.32 and 6.62. In some cases of the above mixts. the pressure curve shows a not well defined max., while the contraction curve has no peculiarity at a corresponding point. This indicates that a max. in the pressure curve is not a criterion for any special mol. process in the mixture.

H. M. GORDIN.

Electrical Conductivity of Solutions in Esters of Small Dielectric Constants. A. N. SAKHANOV. Agric. Inst., Moscow. *J. Russ. Phys. Chem. Soc.*, 42, 1363–70.—It was previously shown (*C. A.*, 5, 3749) that the dissociating power of amines of small dielec. const. depends only upon their constitution, not upon the magnitude of this const. Further measurements of the cond. of solns. of salts in isoamyl acetate, BzOMe and isoamyl benzoate (dielec. consts.: 4.79, 6.62, 4.99) show that the dissociating power of these esters is much smaller than that of the primary amines of the same dielec. const., and with few exceptions their cond. diminishes with diln. From this the conclusion is drawn that the Nernst-Thomson rule concerning the influence of the dielec. const. on the dissociating power holds good only where these consts. are not too small, in which case that power depends solely upon constitution and is entirely independent of the magnitude of the dielec. const. H. M. GORDIN.

Electrical Conductivity of Solutions in Acetic and Propionic Acids. A. N. SAKHANOV. Agric. Inst., Moscow. *J. Russ. Phys. Chem. Soc.*, 43, 526–34.—It was previously shown (*C. A.*, 5, 3749) that the dissociating power of solvents of small dielec. consts. depends solely upon their constitution. This view is corroborated by an exam. of the mol. cond. of solns. of $PhNH_2$, $PhNMe_2$, pyridine, quinoline, LiBr, CaI_2, ZnI_2, and $ZnBr_2$ in AcOH (dielec. const., 6.46) and PrOH (dielec. const., 3.15) at 25°. The cond. of all of these solns. is of the same order as for solns. in primary amines. A peculiarity

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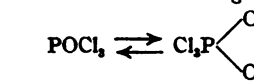
of all such solns. is that the mol. cond. decreases with diln. This is explained by assuming formation of mol. complexes between solvent and solute, *e. g.*, $3Py.rAcOH$, $3ZnBr_2.rAcOH$, $2LiBr.rAcOH$, $2C_7H_8O_2.rAcOH$, r in all cases being most probably greater than unity. H. M. GORDIN.

Anomalous Changes in Electrical Conductivity. I. Decrease of Molecular Conductivity with Dilution. A. N. SAKHANOV. Moscow. *J. Russ. Phys. Chem. Soc.*, **43**, 534–46; cf. preceding abstr.—The most plausible explanation of the decrease of the mol. cond. with diln. in non-aq. solvents is the one of Steele, McIntosh and Archibald (*Z. physik. Chem.*, **55**, 179) according to which the solute forms complexes with the solvents. The mol. cond. in such cases is therefore not equal to the product of the sp. cond. and the diln. ($u = kv$) as is the case with aq. solns., but to the mth power of v ($u = kv^m$) where m is the number of mols. of solute in the given complex under given conditions. With diln. m is supposed to decrease. Since elevation of temp. may reasonably be expected to split up such complexes, *i. e.*, to diminish m, the relation between the changes in the mol. cond. with diln. measured at different temps. should not be independent of conc., as is the case with aq. solns. (*Z. physik. Chem.*, **5**, 250), but should vary with the temp. This is corroborated by comparing the changes with diln. in the mol. cond. of solns. of several substances in AcOH and PrOH at 25° and 100°. It was found that the change in the mol. cond. produced by a change in conc. at 25° is entirely different from that at 100°, the two being representable by entirely dissimilar curves. H. M. GORDIN.

The Electrical Conductivity of Liquid Sulfur Dioxide Solutions at −33.5°, −20°, −10° and +10°. E. C. FRANKLIN. *J. Physic. Chem.*, **15**, 675–97.—Using the app. described in a previous paper (*C. A.*, **4**, 855) F. measured, at the temps. given, the cond. of solns. of KI, KBr, Me_4NI, NH_4CNS, $EtNH_3Br$, and $(Me)_2NH_2Cl$ in liquid SO_2, at concs. ranging from satn. to nearly zero. The results were similar to those found with salts dissolved in other solvents of low ionizing power. The mol. cond. rizes with decreasing conc. to a max., then upon further dilution passes through a minimum and finally approaches the usual max. at infinit dilution. These results are explained by assuming that the dissociated salt is auto-ionized in the conc. solns., that this effect decreases on dilution, and that the decrease of viscosity with dilution causes a rise of ionic mobility. These 2 effects balance each other at the first mentioned max. On still further dilution the auto-ionization disappears and the cond. is due to the dissociating power of the solvent. The temp. coeff. of cond. was found to be positive for conc. and very dil. solns. but negative for solns. of intermediate concs.

D. A. MACINNES.

Phosphorus Oxychloride as Solvent in Cryoscopy. GIUSEPPE ODDO AND ANNA MANNESSIER. Univ. Pavia. *Gazz. chim. ital.*, **41**, II, 212–23.—$POCl_3$ purified by Walden's method (distillation over P_2O_5 in a current of CO_2 and subsequent fractional crystn.; cf. *C. A.*, **5**, 414) could not be obtained with a m. p. higher than 1.37°; on standing, carefully protected from moisture, this m. p. is quickly lowered; the authors believe that the higher m. p. of the fresh samples is due to a disturbance of the equil.



$POCl_3 \rightleftharpoons Cl_2P(O_2)PCl_3$. For the cryoscopic detns. $POCl_3$ having a m. p. of 0.4–0.9° was used; the value of the cryoscopic const. found with various substances was as follows: Ac_2O, 71.9; Pr_2O, 71.6; AcMe, 72.3; hexane, 72.9; S_2Cl_2, 73.8; cyclohexane, 70.2; mean, 72.1. With aromatic compds. the results were: C_6H_6, 76.1; MePh, 79.6; $PhNO_2$, 75.4; naphthalene, 78.8; α-nitronaphthalene, 81.1; indene, 78.3. The authors show that, in the last group of substances, H is substituted to some extent by Cl and $POCl_2$. The value 72.1 found for the cryoscopic const. with

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the first group of substances is therefore undoubtedly the more nearly correct, and Walden's (76.8) is too high. The latent heat of fusion of $POCl_3$ therefore becomes 20.9. The m. p. 2.0 or 2.5° for $POCl_3$ given by Besson and Thorpe, resp., is also too high. CHAS. A. ROUILLER.

P-T Sections. J. P. WUITE. Inorg. Lab., Univ. Amsterdam. *Z. physik. Chem.*, 78, 71–85.—W. develops a 3-dimensional figure for the case where a compd. of the components of a mixt. may exist as a solid phase, and where the vapor pressure of the compd. lies between that of the components. The additional assumptions are made that it is not possible to mix the components in the solid phase, and that there is no sepn. of the liquid mixt. In addition the vapor pressure of the liquid mixt. is supposed to decrease continually with an increase in the % of 1 of its components. The form of the *P-T* sections for this case, and for the simple figure developed by Roozeboom, is discussed and presented in the form of diagrams. W. D. HARKINS.

Influence of Dissolved Salts on the Partition of a Substance between Two Solvents. NICOLAS DE KOLOSSOVSKY. *Bull. soc. chim. belg.*, 25, 183–210.—Preliminary to the investigation of the action of various salts on the system, the coeff. of partition (r) of AcOH between H_2O and Et_2O in the absence of salts was studied for different concs. at 18°. Representing the concs. of AcOH in the aq. layer on the axis of abscissas and the corresponding value of r on the axis of ordinates and, passing the axis of ordinates through the point corresponding to miscibility of the 2 layers, a curve is obtained whose equation is approx. that of a parabola. No well defined curves were obtained when the coeff. of partition was taken as a function either of the total AcOH conc. or of the AcOH conc. in the Et_2O layer. The upper limit of r for concs. approaching 0 is 2.066; and the lower limit is unity (as detd. by the conc. at which miscibility of the 2 layers is reached). The measurement of the resultant of the changes in comp. of the 2 layers due to a salt in soln. was attempted, r in this case being defined as the ratio between the conc. of AcOH in equal vols. of the aq. and Et_2O solns. NaCl in const. conc. lowers r in a degree which becomes less as the AcOH conc. increases. The NaCl conc. in the Et_2O layer increases with the AcOH conc. in the aq. layer. The decrease in r for const. AcOH conc. increases with increasing NaCl conc., but the influence of each unit of wt. of NaCl diminishes with increasing conc. of the salt; this is true for all AcOH concs. The above results hold for all salts tried if no chem. reaction takes place. The effect of different metals in diminishing r increases in the order K–Na–Ba–Mg; no regularity was observed for the negative radicles. The variation of r due to the simultaneous action of 2 salts is equal to the algebraic sum of the variations produced by them separately. Contrary to Berthelot and de Saint Martin, the author finds an increase in r due to AcONa and therefore supposes the existence of acid AcONa in soln.; he considers, however, that this increase is the algebraic sum of a decrease due to the physical action of the salt and an increase due to the chem. action. This was found to be generally true for acetates of the alkali and alkaline earth metals. Max. and min. proportions of acid acetate in soln. were calc. for the K and Na salts for various concs. of AcOH in the aq. layer. The K salt is less dissociated by H_2O than the Na salt. Formation of the acid acetate is favored by an excess of AcOH. Similar expts. with propionic acid indicate the formation in soln. of acid propionates of the alkali metals. H. S. PAINE.

Influence of Dissolved Salts on the Partition of a Compound between Two Solvents. N. DE KOLOSSOVSKY. *Bull. soc. chim.*, 9, 632–7; cf. preceding abstr.—Substituting Cl for NO_3 (in salts of K, Na, and Mg) gives a const. depression of r. Substituting Na for K in the chloride, bromide, and nitrate increases the depression by a definit amt. From these values, moduli are derived for the ions studied, and the equation relating moduli, salt conc., and lowering of r is developed. J. C. HOSTETTER.

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Law of the Moduli in the Variations of the Coefficient of Partition. NICHOLAS DE KOLOSSOVSKY. *Bull. soc. chim. belg.*, 25, 234–8; cf. preceding abstracts.—For salts exerting a strong influence on the partition of any substance between 2 solvents the depression of r is not strictly proportional (for high concs.) to the conc. of the salt; for purpose of comparison such salts should be employed in solns. of 0.1 *N* or less. A new series of expts. was therefore carried out at 21° on the influence of various salts in 0.01 *N* soln. on r. Taking r with no salts present as 2.08, and a variation of +0.03 from this value caused by the NO_3 group, the following sp. moduli were found for various ions: NO_3, +0.03; I, —0.03; ClO_3, —0.10; Br, —0.14; Cl, —0.16; $\frac{1}{2}SO_4$, —0.18; K, 0.0; Na, —0.13; $\frac{1}{2}$Ba, —0.14; $\frac{1}{2}$Mg, —0.23; NH_4, —0.06; $\frac{1}{2}$Cu, —0.20; $\frac{1}{2}$Cd, —0.21; $\frac{1}{2}$Zn, —0.25. As one ascends in the series of monobasic fatty acids, r and its limit of variation decrease, as shown by the following depression of r produced by a 0.1 *N* NaCl soln.: AcOH, —0.30; propionic acid, —0.13; *n*-butyric acid, —0.06; isovaleric acid, —0.01. H. S. PAINE.

The Reactions in a System of Nickel or Platinum, Mercury and Sodium Chloride. C. A. PETERS. *Am. J. Sci.*, 32, 386–7.—This investigation was suggested by work on the electrolysis of NaCl with the Hg cathode. When a soln. of NaCl is allowed to stand over Hg with a Ni wire connecting both liquids, cryst. $Ni(OH)_2$ is formed very slowly, NaOH being produced at the same time. When Pt is substituted for Ni, HgCl is formed, NaOH being likewise produced. J. L. CRENSHAW.

The General Integral of Ordinary Chemical Kinetics. FERENCZ JÜTTNER. *Z. physik. Chem.*, 77, 735–43.—J. integrates the general differential equation of chem. kinetics for an equation of the nth order. W. D. HARKINS.

The Adsorption of Solutions. II. G. C. SCHMIDT. Münster. *Z. physik. Chem.*, 77, 641–60; cf. *C. A.*, 5, 416.—S. has now deduced a new equation for the adsorption of solns.; namely: $sv(a-x) = Kxe^{A(S-x)/S}$, where x is the amt. of material adsorbed, a the amt. of material originally present in the soln., v the vol., s the satn. limit, and A and K consts. The results of expts. with animal charcoal or sugar C and solns. of AcOH in H_2O were in good agreement with the above formula. A reply is made to R. Marc's criticism (*C. A.*, 5, 1703) of S.'s former communication on the adsorption of solns. L. H. ADAMS.

Some Investigations Dealing with the State of Aggregation of Matter. I-III. S. B. SCHRYVER. *Proc. Roy. Soc. London*, (*B*) 83, 96–123; *J. Chem. Soc.*, 100, I, 245; cf. *C. A.*, 5, 3535.—The action of salts in preventing pptn. when formaldehyde is added to an aq. soln. of Witte's peptone is explained by the assumption that the pptn. is due to a polymerization of the methyleneimino-peptone formed by the action of formaldehyde on peptone and that such polymerization is prevented by the adsorption of salts on the surface of the colloidal mols. of the unpolymerized compd. Globulins are regarded as amphoteric substances capable of forming insol. aggregates by combination of the acid group of one mol. with the basic group of another; such aggregates will undergo a slight but definit hydrolysis in the presence of H_2O to form simpler dissociated globulin mols. In the presence of salts adsorption will take place on the surface of these simple mols., thus preventing re-aggregation to the solid form and altering the hydrolysis equil. The correlation of the adsorption capacity of salts with their surface tension and viscosity was verified experimentally and the action of salts on systems other than those containing protein colloids was investigated by a study of the action of salts on the critical soln. temp. of the system phenol-H_2O and on the solubility of *dl*-leucine, *dl*-phenylalanine, caffeine, benzamide, and *p*-toluidine. The greater solubility of serum globulin in salts of polyvalent metals, as compared with those of the univalent metals, was confirmed and is attributed to the direct attraction of the salt mols. to the surfaces of the solid or disperse phases, possibly owing to the

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different elec. charges. No evidence of the direct influence of the state of hydratio n of the salt in soln. on the disaggregating capacity of the latter could be obtained.

H. S. PAINE.

Surface Electric Charges of Living Cells. W. B. HARDY AND H. W. HARVEY. *Proc. Roy. Soc. London*, (*B*) 84, 217–26.—In studying the movement under elec. stress of living cells suspended in films of liquid 1 mm. or less in depth enclosed between glass plates it was found that the upper and lower surface films of H_2O move in the elec. field with considerable velocity, owing to the ions they contain and to a p. d. at the glass-water interfaces, and that this flow along the boundary is compensated under hydrostatic pressure by a return flow in the middle. The velocity of a particle past the observer is thus the algebraic sum of the velocity of the fluid and the velocity of the particle through the fluid. When a suspension of yeast cells and red corpuscles in isotonic sugar was observed in a tube wide enough to reduce the flux of liquid practically to zero, both migrated to the anode, but the corpuscles traveled faster (probably due to greater surface density of the electric charge). In the case of a free H_2O surface (observations were made by means of powdered graphite) similar results were obtained; the exceedingly thin surface film is practically stationary and acts like a rigid solid, while the layer of liquid immediately below is driven by the field past this film in the same direction and with the same order of velocity as the H_2O past the glass. When the current was increased to 0.01 amp., the surface layers ceased to reverse their direction of motion when the elec. field was reversed; this was probably owing to asymmetrical loss of heat due to peculiarities of the observation trough used, thus causing unequal rise in temp. and consequent differences in surface tension. Consideration of the velocity of the H_2O past the surface film as a function of (1) the elec. d. at the interface, (2) the coeff. of sliding friction, and (3) the attraction of H_2O for different substances leads to the conclusion that the adhesion of the film to the H_2O practically reaches its max. when the thickness is still much less than the accepted value for the range of mol. forces; it is probable either that "the coeff. of sliding friction between 2 phases is independent of the Laplacian pressure at the interface or that the range of mol. attraction is much less than Rücker's estimate——50$\mu\mu$."

H. S. PAINE.

Properties of Colloidal Systems. II. Adsorption as Preliminary to Chemical Reaction. W. M. BAYLISS. Inst. Physiol. Univ. Coll., London. *Proc. Roy. Soc. London*, (*B*) 84, 81–98.—Congo red treated with an excess of HCl and dialyzed gives a deep blue colloidal soln. If pure, freshly pptd. $Al(OH)_3$ is treated with this blue colloid, a blue ppt. is obtained. This must be an absorption complex of colloid acid and base lying side by side, but not combined chemically. The chem. comb. of these 2 occurs on heating, the red Al salt of Congo red resulting. Similar phenomena are obtained with the hydroxides of ferric Fe, of Zr and of Th. Equal quantities of caseinogen, soluble starch, filter paper, bone charcoal and sugar charcoal were treated as adsorbents for 18 hours in 2% trypsin soln. and in this soln. with 0.018 mol. $CaSO_4$ added. After filtration 2 cc. portions of the filtrates were added to 20 cc. 5% NH_4 caseinogenate soln., incubated for 4.5 hrs., and the relative amt. of enzyme action detd. by elec. cond. In all cases except with charcoal, the enzyme activity was found less in the presence of $CaSO_4$, *i. e.*, $CaSO_4$ has favored the adsorption of the enzyme. In the charcoal expts., sugar C gave slightly more enzyme activity in the $CaSO_4$ filtrate and bone C a decidedly greater activity in that filtrate. The higher ash content of bone C may have been of sufficient salt conc. to produce the max. adsorption alone, leaving nothing further possible for the $CaSO_4$ to effect. Another factor operating to effect a difference is the adsorbing surface exposed. The finely divided sugar C was flocculated by the addition of the $CaSO_4$. The addition of 0.5% gelatin was found to prevent the flocculation of C by $CaSO_4$

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but the control expts. showed that the gelatin also prevented any effect of $CaSO_4$ on the adsorption of trypsin by the C. From another series of expts. similarly executed the rate of the action of trypsin in varying concs. was found to follow an exponential form of equation but not the Schütz-Borissoff law. The exponent was unity under some conditions and 0.5 under other conditions, but usually varied in value between the two. In some cases or stages of the reaction $CaSO_4$ caused an increase in the rate of action of trypsin, in other cases a decrease. A trypsin soln. was heated to 60° for 10 min., both with and without the addition of C. The subsequent addition of caseinogen showed that the formation of the adsorption complex had to some extent protected the enzyme from heat destruction. I. K. PHELPS.

The Properties of Colloidal Systems. III. The Osmotic Pressure of Electrolytically Dissociated Colloids. W. M. BAYLISS. Inst. Physiol., Univ. Coll., London. *Proc. Roy. Soc. London*, (*B*) **84**, 229–54.—Congo red is not hydrolytically dissociated in soln. and Na caseinogenate only slightly so; the former is electrolytically dissociated to a considerable degree (50% at a diln. of 28 l.), although the ionization is not as great as that of Na salts of other organic acids of small mol. wt. at corresponding diln., probably owing to colloidal aggregation in the case of solns. of the dye salt. The osmotic pressure (measured directly and by vapor pressure detns.) is much lower than would be expected, being over a wide range of conc. about 95–100% of the value in the case of no dissociation. The supposition of Biltz and v. Vegesack that the Na ion, being kept within the membrane merely by electrostatic forces, is inactive in the production of osmotic pressure, is shown to be untenable both by experimental and theoretical considerations. "The curve expressing the ratio of the cond. of Congo red solns. to their osmotic pressure is convex to the axis of abscissas when these are the values of the cond. It is a straight line when expressing the relation of osmotic pressure to molar conc. The value of osmotic pressure per unit increase of cond. rizes with conc., forming an S-shaped curve." The evidence on electrolysis of Congo red solns. is against the formation of complex ions containing both acid and base components. "The possibility of aggregated simple ions carrying the sum of the charges of their components is suggested in order to explain the experimental results." The production of an e. m. f. at the membrane indicates that the cation, whatever its nature, is diffusible. The sign and numerical values of this e. m. f. agree, within experimental errors, with Hardy's equation. The distribution of a foreign salt, such as NaCl, between the soln. of the dye on one side of the membrane and H_2O on the other is always such that its conc. is greater in the H_2O. When CO_2 is in contact with the outer H_2O of the osmometer, no constant osmotic pressure can be obtained in the case of colloidal salts with a diffusible cation, owing to the interchange of ions and the escape of the cation. Congo red appears to obey the gas law so far as the effect of temp. on the osmotic pressure of its solns. is concerned. H. S. PAINE.

Gelatinization and Hydration. P. P. VON VEIMARN. St. Petersburg. *Z. Chem. Ind. Kolloide*, **9**, 25–8.—W. Pauli (*C. A.*, **5**, 1455) shows that the forces acting on a gelatinizing soln. are the same as on crystg. solns. von Veimarn (*Z. Chem. Ind. Koll.*, **5**, 122) gave general methods by which a cryst. substance may be obtained in the gelatinous condition. The factors which make for gelatinizing are great speed in condensing the molecules to crystals (obtained in this case by rapid cooling), presence of different sorts of molecules in the soln. and of large mol. wt., either from hydration or the nature of the material. By immersing solns. of $Mn(CNS)_2$, $Sr(CNS)_2$, $Ca(CNS)_2$, $Ba(CNS)_2$, $Al_2(SO_4)_3$, $CaCl_2$, Fe_2Cl_6, $Na_4Mn(CNS)_6$, $K_4Mn(CNS)_6$ satd. at ordinary temps., into liquid air, transparent glasses were obtained. The same manipulation gave cloudy glasses in the case of $CaBr_2$, CaI_2, $AgNO_3$ and Li_2CrO_4, which are salts forming only a few hydrates. If all the mols. in the soln. are the same a glass cannot be formed

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even by rapid cooling, *e. g.*, minerals held near the m. p. for some time crystallize, however rapid the cooling. Conversely many polysulfides give glasses even on slow cooling, because of their tendency to change from one sort of mol. to another. The salting out of organic colloids is due largely to the tendency of the salt to form hydrates. H. ISHAM.

Absorption Spectra. IV. Influence of the Solvent and the Dilution upon the Validity of Beer's Law. A. W. STEWART AND R. WRIGHT. Sir Donald Currie Lab., Queen's Univ., Belfast. *Ber.*, 44, 2819–26.—Most investigators have found that a layer of 1 *N* soln. of an organic substance, which is 10 mm. thick, gives the same absorption spectrum as a layer 100 mm. thick of its 0.1 *N* soln. However, when I_2 is dissolved in EtOH the absorptive power of the soln. increases as the soln. is diluted; the same is true when the solvent is 80% EtOH, but when the percentage of H_2O is increased to 80, the degree of absorption remains constant at different dilns. In aq. soln. the absorptive power decreases with the diln. A soln. of *p*-nitrotoluene in EtOH gives the same effect as when the solute is I, but the soln. in H_2O does not give the opposit effect. The behavior of the I may be explained by the assumption that in alc. an oxonium derivative is formed, and that this is ionized as the soln. is diluted. An I atom capable of ionization causes practically no absorption, while the alkyl iodides show a very strong selective absorption. Azobenzene, which as an indifferent substance forms neither addition nor ionization products, follows Beer's law both in EtOH and in aq. solns. W. D. HARKINS.

Spectrum of Oxygen at the Negative Pole. F. CROZE. *Compt. rend.*, 153, 664–5.—The negative spectrum of O was first described by Schuster in 1870 as consisting of 5 bands, the 4 more refrangible being comprized between λλ 6010-5960, 5900–5840, 5630–5553, and 5292–5205. Steubing has shown that the first two of these bands are really parts of one band. C. now finds another more refrangible band, which may be resolved into 11 components of varying intensity, ranging from about 68–65 A. u. All the bands of the negative O spectrum are true bands degraded towards the violet, and not diffuse bands as they have been formerly described. J. HUNT WILSON.

Combustion Spectra of Hydrocarbons and of Different Metals. J. MEUNIER. *Compt. rend.*, 152, 1760–2.—Mixtures of illuminating gas and air containing less than 10% or more than 33% of the former do not inflame. In the latter case the excess of combustible gas acts as an extinguisher of flame. Between these limits the velocity of ignition increases from 10% to 18–20%, and then decreases. In the Bunsen burner where it is possible to vary the proportions of air and gas there will be obtained an inner and an outer region of flame. It is necessary that the velocity with which the flame is propagated through the mixture does not exceed the velocity which the mixture passes up the burner. As the % of gas in the mixture is decreased the inner cone diminishes in size and the envelope changes in color, being bluish at 33%, green at 30 to 28%, and bright blue at about 25%. The sheath covering the inner cone is about 1 mm. thick and gives the Swan spectrum, best when the mixture contains 25–26% gas. It is remarkable that O does not show its presence by any ray. H behaves in a similar fashion, the limits of inflammability extending from 13%–70% H. With a H flame 4–5 cm. in height a Pt wire covered with chalk gives a persistent spectrum of Ca, with the blue line λ 4226. In the ordinary gas flame to reproduce this spectrum it is necessary to use $CaCl_2$ with excess of HCl. Mg, Zn, Cd, Ni, Co, Cu, Pb, Li, Sb all give characteristic spectra in the H flame. J. HUNT WILSON.

Some Spectral Phenomena which Accompany the Inflation of the Spark by a Magnetic Field. G. A. HEMSALECH. *Compt. rend.*, 152, 1086–9.—When the spark produced by the discharge of a condenser of 0.04 microfarad capacity, and self induction of 0.012 to 0.05 henry is passed between Ca electrodes under ordinary conditions

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there is given only the spectrum of Ca. Under the influence of a sufficiently strong magnetic field (4000–6000 c. g. s.) the spark is inflated and forms a field of luminous vapor several cm. in height. The spectrum includes the rays of Ca and negative lines of N, indicating that the current is carried in part by N ions. In an atmosphere of H the discharge gives rise to a field of luminous H of a reddish color, found in a plane perpendicular to the lines of force. It resembles the luminous disk shown by the high tension arc. The author has detd. the relative intensities of the rays of K and Ca, and their height, measured parallel to the lines of force. The rays *H* and *K* of Ca attain about the same elevation as the blue ray, λ 4227. On the other hand, when the spark is inflated by the method of air currents the blue ray suffers greater displacement than *H* and *K*. In O with a field of 6000 c. g s. the blue ray attains the same height as *H* or *K*, and since the spark in O is very rich in Ca vapor it is possible that the density of the vapor may play an important part in the modification of the spectra. Ca in H, under the above conditions, gives a spectrum very similar to that which has been observed in the chromosphere. This would seem to show that the latter is due to the influence of the solar magnetic field. J. HUNT WILSON.

Spectrum of Air Given by the Initial Discharge of Self Induction Sparks. G. A. HEMSALECH. *Compt. rend.*, 152, 1471–4.—The spectrum consists of positive bands of N and the first line spectrum of air, the latter predominating under ordinary conditions. The initial discharge was isolated by the method of air currents. The spectrum studied was that given by a spark 3 mm. in length, produced by the discharge of a condenser of 0.0024 microfarad capacity, and a self induction of 0.044 henry. During the initial discharge the bands predominate, while the lines are faint. The bands apparently belong to the second group of Deslandres and form a series of triplets. As the length of the spark is increased the bands become fainter while the lines increase in brilliancy. With a condenser of large capacity the initial discharge is feeble. When the capacity is diminished this discharge becomes more intense and the bands and lines increase in about the same proportion. Increase of self induction is accompanied by a corresponding increase in the initial discharge and its spectra, which leads to the conclusion that with a given spark length the spectrum of the initial discharge varies inversely as the capacity of the condenser; and directly as the self induction of the discharging circuit. Increasing the capacity of the electrodes gives rise to a reinforcement of the line spectrum, accompanied by diminishing bands, and *vice versa*. J. HUNT WILSON.

The Spectrum of Beryllium and the Bands in Light from Various Sources. L. BOISBAUDRAN AND A. DE GRAMONT. *Compt. rend.*, 153, 318–21.—In addition to 2 previously announced bands in the green and blue, the authors announce a fainter band in the indigo and give wave lengths of the principal maxima detd. by comparison with known spark spectra. Well developed bands appear in the oxyacetylene flame and by the action of the uncondensed spark discharge on a soln. of the chloride. This also brings out the line spectrum clearly. The similarity of the spectra of Be and Al is pointed out. R. F. JACKSON.

The Anode and Cathode Spectra of Various Gases and Vapors. G. STEAD. Cavendish Lab. *Proc. Roy. Soc. London*, (*A*), 85, 393–401.—Some years ago J. J. Thomson stated that when an elec. discharge is passed through vacuum tubes containing various compds., the electropositive elements have a tendency to appear at the cathode while electronegative elements showed a preference for the anode. This interesting behavior was explained by supposing that something analogous to electrolysis took place in the gases under the influence of elec. discharge. The present paper is an account of some further investigations of this phenomenon. The anode and cathode spectra of the following gases were studied: H, HCl, $CHCl_3$, CCl_4, $SiCl_4$, $SnCl_4$, C_6H_6, C_6H_5Cl,

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CS_2, H_2S, SO_2, HBr, HI, EtBr, MeI, C_2N_2, and HCN. The gases were all carefully purified. The observations were made partly with an ordinary two-prism spectroscope and partly with a Hilger const. deviation wave-length spectroscope. In general the results obtained confirm the earlier observation of Thomson that the spectra of electronegative elements tend to appear at the anode and those of electropositive elements at the cathode. L. H. ADAMS.

The Vacuum Tube Spectrum of Mercury. FRANK HORTON. Cavendish Lab., Cambridge. *Proc. Roy. Soc. London*, (*A*), 85, 288–302.—The conclusion is reached that Hg is capable of giving several distinct line spectra when subjected to a discharge in a vacuum tube, depending on conditions such as pressure and discharge potential. A number of new lines in the red and orange were discovered and measured.

L. H. ADAMS.

The Dynamical Nature of the Molecular Systems which Emit Spectra of the Banded Type. E. T. WHITTAKER. *Proc. Roy. Soc. London*, (*A*), 85, 262–70.—Mathematical treatment of a system consisting of vibrating mols., which give rise to radiation.

L. H. ADAMS.

Ionization Due to an Incandescent Metallic Filament in a Vacuum Bulb. MASAO KINOSHITA AND RYUJIRO ICHINOHE. Imp. Univ., Kyoto. *Mem. Coll. Sci. Eng. Kyoto*, 3, 171–88.—When a metallic or C filament is raised to a sufficiently high temp. by the passage of an elec. current, negative corpuscles are emitted; at a still higher temp. the ionization of gas molecules by collision with the corpuscles takes place. Measurements were made at various filament temps. (detd. with an optical pyrometer) of the current which flowed between the filament and a surrounding Cu cylinder, with varying potential differences between cylinder and filament. The satn. current was found to be considerably greater than that deduced from Richardson's theoretical formula (*Phil. Trans. Roy. Soc. London*, (*A*), 201, 497). The conclusion is reached that at temps. above 2400° abs. ionization by collision takes place even under the influence of a very feeble elec. field. The amt. of current due to the ionization in the satn. state is approx. one-half of the observed current. L. H. ADAMS.

Carriers of Electricity in Gases. A. BECKER. Radiol. Inst., Univ. Heidelberg. *Ann. Physik*, 36, 209–80.—Lenard (*Ann. Physik*, 12, 475) has shown that cond. in gases is caused primarily by the breaking off of negative electrons from neutral mols., and the subsequent taking up of these electrons by other gas mols., so that, at the instant of their formation, all carriers of elec. are singly charged gas mols. However, many observers have proved the existence of very much larger carriers. The writer found that Röntgen rays cause the formation of only relatively small carriers in CO_2, and that these are not increased in size by the presence of large amts. of water vapor in the gas, nor by other similar chemically neutral gases. Ultraviolet light causes the formation of large carriers in the presence of certain vapors, since it seems to favor the formation of nuclei. Such nuclei are present after the gas has passed through absorbent cotton, which filters out all solid or liquid particles, so that the ultraviolet light must form a gaseous product which passes the plug of cotton and then reacts with another constituent of the gas to form a solid product. The former gaseous product is probably O_3, which reacts with SO_2, NH_3, CS_2, HI, H_2S and $(NH_4)_2S$ to form solid products. Expts. with O_3 prove that large nuclei are formed by its action on these gases, and that large carriers of elec. are formed when the gas is acted on by Röntgen rays. The number and size of the nuclei increase with the concs. of O, and of the gas which reacts with it. The presence of H_2O alone is not sufficient to cause the formation of large carriers. It is well known that the amount of O_3 formed by ultraviolet light in a gas containing O_2 increases with the intensity of the light, and it is observed that the size and number of the carriers is also increased. Calculations by Lenard's formula give

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a radius of the large carriers in CO_2 gas as high as 90 times the radius of a CO_2 mol., but this is greater than the free path. However, Sachs obtained approx. the same value by the method of a diabatic expansion. The nuclei formed in air are little affected by cold, but decompose somewhat at 160°, which corresponds to the temp. of decomp. of NH_4NO_2 and NH_4NO_3. Cathode rays give the same results as ultraviolet light, but in a much smaller degree. Their action is possibly due to a formation of a small amt. of this form of light. The size of the large carriers increases with the time, which must be due to the addition of substances capable of forming nuclei, to nuclei already present, due to such peculiar forces of attraction on the surfaces of the nuclei as are already known in the case of solids separated in liquids. The formation of large carriers in gases free from solid or liquid particles seems to be due to the formation of such particles (nuclei) by the formation and chem. action of O_3, and the subsequent action upon these nuclei of small carriers such as are formed by the action of Röntgen rays. The largest of the small carriers thus formed in CO_2 have from 5 to 6 times the radius of the CO_2 mol., if Lenard's formula is used as the basis of calc. W. D. HARKINS.

Conductivity of Gases at Atmospheric Pressure under the Influence of High Alternating Voltage. A. CHASSY. *J. Physique*, [5] 1, 737–44.—The cond. was inferred from the increase in the apparent capacity of a condenser filled with the gas. This apparent capacity is const. for low voltage (no conduction), then increases rapidly with the voltage, soon approaching a max., after which it remains nearly const. again. Frequency has no effect. The cond. is greater for H than for air, and enormously less than for pure H_2O. W. P. WHITE.

Stefan's Constant. C. FÉRY AND M. DRECQ. *J. physique*, [5] 1, 551–9.—Earlier work of Féry is repeated, with greater experimental precautions, intended to avoid criticisms which have been made upon the previous work; in particular, the hollow cone, which received the radiation, and the calibrating spiral were both inserted into the bulb of a large alc. thermometer, which was thus equally affected by both of them. The temps. used were all near the m. p. of Au, 1064°. The constant was detd. as 2.073, against 2.00, found previously. The difference is due to the fact that in this case the effective or pyrometric temp. of the radiator was taken, in the other, the true temp. as measured by a thermoelement. The authors make the important and sensible suggestion that the temp. of a (not black) body, as measured by a pyrometer, be called the "effective temp." and not the "black temp.," since that is precisely what it is not. W. P. WHITE.

A New Method of Determining the Potential Gradient of Glow and Arc Discharges in Cylindrical Glass and Quartz Tubes. W. MATTHIES. *Ber. physik. Ges.*, 1911, 552–68.—Glass and quartz tubes, within which an elec. discharge is taking place, gradually acquire a temp. sufficiently high to impart a slight elec. cond. to the walls themselves. When this condition is reached each point on the exterior of the wall takes on the potential of the gas nearest that point. Thus the p. d. between 2 points in the tube is obtained by slipping thin wires around the outside of the tube and measuring the p. d. between the same. Glass became sufficiently conducting at 150°; fused quartz at 270°. The method is applicable only to those portions of the discharge which give rise to equipotential surfaces perpendicular to the axis of the tube. This excludes the cathode dark space in which this necessary condition is not fulfilled. To test the reliability of the method, simultaneous measurements involving the use of exploring electrodes were carried out and the agreement was within the limits of experimental accuracy. The method is applicable to the large tubes of a Hg arc as well as to capillaries carrying a disruptive discharge. A. H. PFUND.

The Selective Photoelectric Effect of Non-alkali Metals. R. POHL AND P. PRINGSHEIM. *Ber. physik. Ges.*, 1911, 474–81.—In studying the photoelec. behavior of the

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alkali metals with regard to wave-length of the exciting light, the authors had previously found that for each element studied there was a characteristic region of the spectrum which yielded a max. photoelec. current. The present discussion deals with similar expts. performed with Ba, Hg, Pb, Tl, Sn, Cd and Bi. Energy measurements were carried out by means of a thermopile; hence all photoelec. measurements could be reduced to "equal energies." It was found: (1) That Ba possesses a selective effect, whose max. lies at $\lambda = 280\mu\mu$; (2) that Hg, Pb, Tl, Sn, Cd and Bi show only the normal effect toward radiations of $\lambda > 200\mu\mu$. The more readily oxidizable the metal, the further does its photoelec. effect extend toward the region of greater wave lengths. These results are in excellent agreement with the theoretical considerations of F. A. Lindemann (next abstr.). A. H. Pfund.

Calculation of the Free Periods of the Electrons which Give Rise to the Selective Photo effect. F. A. Lindemann. *Ber. physik. Ges.*, 1911, 482–8.—The author bases his calculations on the observations of Pohl and Pringsheim, who showed that the selective photoelectric effect disappears entirely if the light incident upon the metallic plate is so polarized that the electric vector lies perpendicular to the plane of incidence, and that the effect is most marked if the electric vector lies in the plane of incidence. It is assumed that a free electron coming within the sphere of influence of a + ion is caused to rotate about the same in an elliptical orbit when acted upon by an external, oscillating electric field normal to the surface. If the free period of the electron coincides with that of the existing radiation the eccentricity of the electron's orbit becomes so great that the electron flies out from the metal. The character of the orbit in question is defined by Kepler's third law and from this it follows that the wave length (λ') at which the electron is expelled—and hence, at which the selective effect is a max.—may be calc. from the relation $\lambda' = 65.3\sqrt{a/n}$, where a is the at. vol. of the metal and n the valency. The remarkable agreement between calculation and observation is shown by the following figures, the first number in each case being the at. vol. of the element, the second the calc. free period (λ'), and the third the value actually observed by Pohl and Pringsheim for all the metals which exhibit a selective effect in the region $\lambda > 280\mu\mu$: Cs, 70.6, 550; Rb, 56.3, 490, 480; K, 45.0, 438, 440; Na, 23.5, 317, 320; Li, 11.9, 225; Ba, 36.7, 280, 280; Sr, 34.5, 271; Ca, 25.4, 233; Mg, 14.0, 172. It is further shown that the width of the spectral range covered by the selective effect increases as the position of the max. moves toward shorter wave lengths. The alloying of an active metal with one that is inactive brings about a shift of the max. toward the violet by an amt. which increases as the inactive metal is chosen more and more electronegative. For Cs, Rb, K and Na $\sqrt{\lambda'}$ is proportional to the wave length of the last (ultraviolet) line of the principal (emission) series. A. H. Pfund.

Radiation of Gas Mantles and of Amorphous Bodies in General. A. Foix. *Ann. chim. phys.*, 23, 281–347.—Formulas giving the emissive, reflective, and transmissive power of amorphous substances in terms of the coeff. of absorption and of diffuse reflection are developed, and the influences, of surface d., thickness, and diffusion are discussed. The formula for the emissive power is verified experimentally with lamellas of CeO_2 or CeO_2-ThO_2 mixts. The Welsbach mantle is essentially a mixt., and its luminosity does not depend on its components but rather on the surface d. of the CeO_2. The comp. of the Welsbach mantle is not the best possible.

George W. Morey.

The Positive Potential of Aluminium as a Function of the Wave-length of the Incident Light. J. R. Wright. Ryerson Phys. Lab., Univ. Chicago. *Physic. Rev.*, 33, 43–52; see *C. A.*, 5, 2362. A. H. Pfund.

Magnetic Study of the Role of Water in the Constitution of Some Solid Hydrates. E. Feytis. *Comp. rend.*, 153, 668–71; cf. *C. A.*, 5, 2028.—From a comparison of the

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coeff. of magnetization detd. experimentally with that calc. by the additive rule for sulfates of Cu, Ni, Co, Sa and Gd, it is concluded that the additive rule is not strictly applicable to the salts of strongly electropositive metals which form complex salts.
GEORGE W. MOREY.

Viscosity of Saccharin Solutions (ORTH). **28.** Palmitic Acid—Sodium Palmitate (DONNAN, WHITE). **27.** Electrical Conductivity of Alloys (GUERTLER). **9.**

BIRD, R. B.: **Modern Science Reader with Special Reference to Chemistry.** New York: Macmillan, $1.10.

COLSON, A.: **Contribution a l'etude de la chimie.** Paris: 8°, 130 pp., 3 Fr.

FINDLAY, A.: **Practical Physical Chemistry.** 2nd Ed. London: 8°, 288 pp.

JAMES, J. H. AND SCHAEFFER, J. A.: **Experiments for Engineering Students in General Chemistry.** New York: McGraw-Hill, $1.00.

KAHLENBERG, L.: **Laboratory Exercises in General Chemistry.** 3rd Ed. Madison, Wis.: Cantwell, 214 pp., 90 cents.

PASTOURIAUX, L.: **Leçons de chimie.** Paris: 12°, 216 pp., 1.50 Fr.

POULENC, C.: **Les nouveautès chimiques pour 1911.** Paris: 8°, 354 pp., 4 Fr.

RANSOM, J. H.: **Experimental General Chemistry.** 2nd Ed. New York: McGraw Hill, 145 pp., $1.00.

ROBERTS, E.: **Famous Chemists.** London: G. Allen & Co., 2s 6d.

ROTH, W. A. AND EISENLOHR, F.: **Refraktometrisches Hilfsbuch.** Leipzig: 8°, 146 pp., 6 M.

SPINNEY, L.: **A Text-book of Physics.** New York: Macmillan, 605 pp., $2.75.

STANLEY, F.: **Lines in the Arc Spectra of Elements.** London: A. Hilger.

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4. ELECTROCHEMISTRY.

C. G. FINK.

The Paragon Electric Furnace. J. HARDEN. *Electrician*, **68**, 137; *Met. Chem. Eng.*, **9**, 595; cf. *C. A.*, **5**, 1560. C. G. F.

Electrochemistry in 1910. H. BORNS. *Chem. Ind.*, **34**, 648–60. E. J. C.

Possible Reductions of the Power Consumption in Electric Steel Refining Furnaces. CARL HERING. *Met. Chem. Eng.*, **9**, 590.—The following deductions are based on empirical data. The heat losses are due to radiation from the top and conduction from the sides and bottom. In this case it is assumed that the loss by radiation from the top is at the same rate per unit surface as that by conduction from the sides and bottom. Thus ideal conditions would be to have the metal enclosed in a sphere but this is impracticable so a hemisphere is used leaving a dome of an equal hemisphere above for working space. Actual test required 180 kw. to keep the steel melted over night in a 5-ton, 2-ring, single phase, induction furnace. This gave the value of 1.2 kw. per sq. ft. of metal surface. In a Roechling-Rodenhauser single-phase, 2-ring, induction furnace, the value was 1.17 kw. per sq. ft. A ton of molten Fe occupies a vol. of about 5.13 cu. ft. Taking the bottom of the hearth as being hemispherical and the metal just filling the hemispherical part the kw. necessary to keep it melted can be calc. thus: Tons, 5; cu. ft., 25.7; diameter, 4.61 ft.; kw., 60; kw. per ton, 12. The last 2 figures will be found to be far smaller than those of present practice, showing that there is a possibility of very great improvement in reducing the consumption

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of energy. The actual figure for the Hiorth 5-ton induction furnace was 36 kw. per ton as against a possible 12 kw. Any power used for m. cold slag, raising the temp., supplying the losses through open doors, electrodes, etc., must be added hereto.

G. F. YESSLER.

Preparation of Electric Steel in the Stassano Furnace. ERNST SCHMELZ. *Oesterr. Z. Berg.-Huettenw.*, 59, 295–301, 313–7, 325–8, 341–2.—S. briefly reviews the principle types of elec. steel furnaces now in use and then describes in detail the construction and working of the Stassano furnace. Numerous tables covering comp. of charge, product and cost are given.

L. K. MULLER.

Electric Furnace in Steel Making. C. G. OSBORNE. *Elec. World*, 58, 1243.—A general discussion of the 4 processes of making steel, Bessemer, open hearth, crucible and elec. furnace. The economy of the elec. furnace proximates that of the crucible process for small quantities; futhermore a more uniform heat is obtained.

W. E. VAN KEUREN.

The Gronwall Steel Refining Furnace. T. D. ROBERTSON. *Met. Chem. Eng.*, 9, 573.—Drawings are shown of this new furnace which is a tilting arc furnace utilizing two-phase a. c. The chief advantages are that rotary transformers are eliminated, an even distribution of heat is obtained throughout the charge, and improved refining conditions result from the circulation of the molten metal.

W. E. RUDER.

Design of a 30-Ton Induction Electric Furnace. A. HIORTH. *J. Ind. Eng. Chem.*, 3, 849–55.—The design of this furnace has been based upon the data and results obtained with the original 5-ton furnace in Jessingfjord, Norway. A table showing the principal data for the old furnace and the new one is given. The total capacity for the old furnace is 5 tons; new furnace 30 tons. Energy used 250 kw. and 700 kw. Power factor 0.65 and 0.50. Kind of current 1-phase and 3-phase, resp.

C. N. MOORE.

The Production and Utilization of Ozone in Europe. J. B. C. KERSHAW. *Elec. World*, 58, 1192.—Removal of the dust and moisture from the air and of the suspended or chem. impurities from the H_2O is an essential preliminary to the successful use of O_3. The various types of machines now made for the production of O_3 by the silent elec. discharge are in many cases improved forms of the first type of app. constructed by Werner von Siemens in the year 1875. The Siemens & Halske, Otto, Rosenberg, De Fries' and Vosmaer types are described and illustrated. A large number of installations for H_2O purification are mentioned. The yield of O_3 can be calc. from thermochem. data that 1 h. p. hr. ought to yield 1030 g. A yield of 184 g. per elec. h. p. hr. is claimed for the Rosenberg; an av. figure is about 100 g. As regards the working cost of air purification Siemens & Halske state that the elec. energy required for an ozonizer producing 1000 cu. m. to 5000 cu. m. air per hr. ranges between 30 w. and 150 w. and that a complete ventilating equipment, including the fan, for a building requiring 21,000 cu. ft. of purified air per hr. would take 175 w. The cost of air purification by means of O_3 is not prohibitive and that in view of the benefits which may be obtained the cost is trifling. The absence of N oxides from the ozonized air is imperative, since these oxides have a very harmful effect upon the mucous membrane of the nose and bronchial tubes.

W. E. RUDER.

The Synthesis of Very High Per cent. Hydrogen Peroxide by means of the Silent Electric Discharge. FRANZ FISCHER AND MAX WOLF. Electrochem. Lab., Tech. Hochschule, Berlin. *Ber.*, 44, 2956–65.—A mixture of H and O was subjected to the silent elec. discharge; in order to avoid explosion from chance sparks, it was necessary to work at diminished pressure, or to take the O and H in such proportions that they were not explosive, or to dil. the mixt. with other gases such as CO_2

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or A. The expts. under diminished pressure were carried out as follows: The app. was so arranged that when the pressure had been lowered to 3 cm. by means of a water suction pump, the generation of H and O started automatically. The mixt. passed through a U-tube cooled in liquid air, where it was subjected to the silent elec. discharge between 2 Al electrodes placed one at each end of the tube. Three expts. gave 2.25%, 2.88%, 2.56% of the possible yield, calc. from the amt. of H and O sent through. The conc. of the H_2O_2 formed was too low for detn. The low yield was partly due to the small amt. of gas present. Expts. in which the U-tube was cooled to —20° gave no results. The limit of pressure of H and O mixt. which cannot be exploded was detd. to be about 146 mm. (partial pressure of water vapor in this mixt. was 35 mm.) The expts. with non-explosive mixts. of H and O were as follows: For excess O, the limit of explosibility was found to be about 5.45 vol. % H and 94.55 vol. % O. With excess H, the limit is about 5.3 vol. % O and 94.7 vol. % H. When mixts. of 3 pts. H and 97 pts. O were subjected to the silent elec. discharge, O_3 was practically the only product. The expts. were therefore made with mixt. of 3% O and 97% H. This mixt. was passed at a regular rate (about 1 l. in 3 hrs.) through H_2SO_4, then through a Berthelot tube, covered inside and outside with tin-foil. This flask was cooled in various ways. At 22°, the best result was 6.4% of the theoretical. At —20°, 34.1 and 33.6% of the theory were produced and at —80°, 54.0%, and at the temp. of liquid air, 59–87.5% H_2O_2. If it is assumed that the rest of the O is transformed to H_2O, the above figures also represent roughly the % by wt. of the H_2O_2 in the soln. produced; since some O_3 was formed the sols. were certainly more conc. than this. An expt. was made with the H and O mixt. diluted with CO_2 (1 vol. [H_2O] and 4 vols. CO_2) with the Berthelot tube cooled with ether and CO_2; 4.0% of the theory was obtained.

R. W. Moore.

Electrolytic Refining at the U. S. Mint, San Francisco, Cal. E. B. Durham. *Bull. Am. Inst. Min. Eng.*, 58, 811–38.—Ag refining is carried on in earthenware cells with an electrolyte consisting of H_2O with 3% of Ag as $AgNO_3$, from 1.5–2.5% of free HNO_3, and a little glue; anodes of crude Ag bullion running about 0.6 in Ag, 0.3 in Au, and 0.1 in base metals; and cathodes of pure Ag; using a c. d. of 8.3 amp. per sq. ft. of cathode-surface. The residue rich in Au from the Ag cells, with crude Au bullion, is treated in porcelain cells having a chloride electrolyte carrying 70 g. of Au per l. and 10–12% free HCl; and Au cathodes, using a c. d. of 90 amps. per sq. ft. of cathode-surface. The Au is redeposited about 999.7 fine in a 2nd set of cells. Cu and precious metals including those of the Pt group are pptd. from the wash-waters and spent electrolyte by means of scrap Fe and the Cu deposited in cells in a $CuSO_4$ electrolyte containing 3% Cu as sulfate and 3–4% free H_2SO_4 with a c. d. of 10 amp. per sq. ft. of cathode surface. Residues from these cells are collected, washed, dried and pressed into bars for treatment for Pt, etc.

C. N. Moore.

New and Used Electrolytes of Lead Storage Batteries. Virginio Luchini. Milan. *Ind. chim.*, 11, 277–80.—A brief review is given of the work which has been done on the effect of impurities in the H_2SO_4 used in Pb batteries. The following method for detg. $HClO_4$ (which is the only form in which Cl occurs in old acid) is recommended: To 50 cc. of acid is added 0.01 *N* $KMnO_4$ until a faint pink color persists, the liquid neutralized with 40% KOH, evapd. to dryness in Pt crucibles, heated 0.5 hr. at 130–140°, then 4–5 min. at dull red heat, the residue dissolved in H_2O, the soln. conc. to 300 cc., HNO_3 added, and the Cl detd. as AgCl.

Chas. A. Rouiller.

Edison Accumulators in Electroanalyses. O. Brunck. Chem. Lab., K. Bergakad. Freiberg. *Z. angew. Chem.*, 24, 1993–7.—This cell is very useful in the sepn. and detn. of metals electrolytically. Tables of sepns. are given for Ag, Cu, As, Sb, etc.

W. E. Ruder.

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Effect of Low Temperature on the Alkaline Storage Battery. W. E. HOLLAND. *Electrician*, 68, 165.—Attention is called to a series of low temp. tests made upon the Edison alk. storage battery by the Elec. Testing Labs. The tests showed a critical temp. below which the capacity was low, and above which the full capacity was obtained. The remedy suggested embodied a heating unit in the battery box operated by the battery when the vehicle was stationary, the battery heating itself during normal discharge. A well closed battery box at 65° could stand 4 hrs. in a 7° breezy atm. and only drop 10°, not sufficient to go below the critical temp. W. L. VAN KEUREN.

The Fallacy of the Baumé Scale. CHARLES H. PROCTOR. *Metal. Ind.*, 9, 416.—The custom of many platers of using the d. of their solns. as shown by a Bé. hydrometer as an indication whether their baths will work correctly or not is not justifiable. The hydrometer is useful in obtaining correct initial concs., but after the bath has been used, it may have the desired d. and yet the concs. of the active components of the bath may vary widely from what they should be. A knowledge of the chem. comp. of the bath is necessary for the solution of many of the platers' troubles.

R. W. MOORE.

The Cost of Arc Lighting and General Service from Medium and Small Size Municipal or Private Plants. W. E. REED. *Proc. Am. Inst. Elec. Eng.*, 30, 2423–35.—A general summary of the items and conditions affecting cost together with plant data on a combined municipal water and light plant which has given excellent results under the system outlined. C. N. MOORE.

Metal Filament Lamps. R. A. HOUSTON. *Electrician*, 68, 187; see *C. A.*, 5, 1561. C. G. FINK.

Thickness of Electric and Thermal Insulation. CARL HERING. *Elec. World*, 58, 1303.—The article points out and discusses some of the results obtained by using a rigidly correct formula instead of the ordinary arithmetical average between the inside and outside diams. The formula is: $R = r/2\pi L$ nat. log. D/d, in which R is the total resistance in ohms, r the sp. res. (resistivity), L the axial length of the cylinder, D the outside diam. and d the inside diam. R and r may both be in megohms or in thermal ohms in the case of thermal insulation. For common logarithms the formula can be reduced to $R = 0.366468\ r/L$ com. log. D/d. G. F. YESSLER.

Carborundum Refractories. ANON. *Met. Chem. Eng.*, 9, 613.—"Carborundum firesand," one of the by-products in the manuf. of carborundum, is mixed with a binding material such as Na silicate or fire clay and used as a refractory. Definit instructions are given for its use in the lining of crucible brass furnaces; lining of tilting and rotary oil-burning furnaces; repair of firebrick linings; preparing carborundum furnace paint and carborundum mortar. G. F. YESSLER.

Corrosion of Iron by Direct Current (HAYDEN). 9. Lead Silicates (WEILLER). 6. Ozone in Water Purification. 14. Formation of Oxidizing Agents in Air (KHLOPIN). 14. Electrical Conductivity of Alloys (GUERTLER). 9.

U. S., Reissue 13,316, Nov. 21. C. E. ACKER, Ossining, N. Y. Original Pat., No. 914,100 (*C. A.*, 3, 1369). **Producing alkali-metal cyanogen compounds,** *e. g.*, Na cyanamide or cyanide, by continuously electrolyzing a molten compd. of the alkali metal, *e. g.*, NaOH, alloying the septd. alkali metal with a cathode metal, *e. g.*, Pb, removing the alloy and reacting on the alkali metal, at a higher temp. with a nitrogenous gas and carbonaceous material, and returning the residual metal to the cathode.

U. S., 1,004,119, Sept. 26. J. WEBER, JR., and O. COPE, Toledo, Ohio. **Electroplating apparatus,** comprizing a rotatable drum, a segmental commutator carried by

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end of the drum, an elec. brush working thereon, and a number of cathode units within the drum and each comprizing at least one member which is secured to the side of the drum and extends longitudinally thereof, cross arms attached to these members, arms rizing from the stationary shaft on which the drum is mounted and having their upper ends laterally notched, a bar mounted in the notches and connecting the arms above the shaft (the bar being a non-cond. of elec.) and an anode mounted to freely rock on the bar and having arms suspended from the bar at opposit sides of the shaft and parallel to it.

U. S., 1,004,249, Sept. 26. J. H. FISCHER, E. G. LUENING and A. W. COLLINS, Milwaukee, Wisc. **Electrolyzing apparatus unit** consisting of a single open bottom metallic case having a metallic diaphragm therein dividing the case into 2 cells each of which is provided with an upper gas-outlet tube, an anode insulated in one of the cells, and a cathode insulated in the other cell, the case and its contents being intended to be submerged in an electrolyte, *e. g.*, in the manuf. of H and O.

U. S., 1,004,469, Sept. 26. A. L. ROBINSON, Niagara Falls, N. Y. **Preparing charges for graphitization in an electric furnace** by placing between a body of C and a refractory embedding material, a layer which will become caked or solidified during the operation of the furnace, and including bituminous matter and a refractory filler, *e. g.*, bituminous coal 25%, coke 50% and "ground furnace crust" (carborundum, siloxicon, etc.) 25%.

U. S., 1,004,509, Sept. 26. F. S. WASHBURN, Nashville, Tenn. **Making calcium cyanamide from calcium carbide** by causing finely divided carbide to be repeatedly raised and dropped while moving through an atm. of N and maintaining the carbide and N at reacting temp. (above 1200°).

U. S., 1,004,530–1–2–3–4–5–6, Sept. 26. E. E. F. CREIGHTON, Schenectady, N. Y. **Electrolytic lightning arresters.**

U. S., 1,004,557, Oct. 3. W. D. COOLIDGE, Schenectady, N. Y. **Electric furnace** having a heater tube consisting essentially of W, the tube having a surface coating consisting principally of thoria, a packing of refractory oxide surrounding the tube to protect it, and connections for passing an inert gas through the packing to protect the tube from oxidation.

U. S., 1,004,673, Oct. 3. J. F. MONNOT, New York, N. Y. **Coating ferrous metals with copper,** forming a dense coherent coating, by making the ferrous metal a cathode in a bath of fused electrolyte containing dissolved Cu, the bath being maintained at a temp. above the m. p. of Cu.

U. S., 1,004,793, Oct. 3. V. DE KARAVODINE, Billancourt, France. **Making electrodes for secondary batteries** by forming a paste made of $PbSO_4$, H_2O and NH_3 into the desired shape, electrolytically forming the mass into spongy Pb in a soln. of $(NH_4)_2SO_4$ and NH_4OH, and electrolytically treating the spongy Pb to form PbO_2.

U. S., 1,004,923, Oct. 3. W. A. SMITH, Niagara Falls, N. Y. **Expelling volatil constituents from commercial forms of carbon,** *e. g.*, from petroleum coke, by passing an elec. current between terminals embedded in a body of the C or carbonaceous material supported by fixed refractory walls, and advancing the body in a direction substantially parallel to the lines of current flow.

U. S., 1,004,924, Oct. 3. *Idem.* **Electric resistance furnace,** comprizing a shaft, an electrode arranged near the upper end of the shaft and a second electrode located axially intermediate the ends of the shaft and so supported as to permit free passage of the charge, mechanism for causing a regulated downward movement of the charge, a combustion chamber surrounding the interior wall of the furnace adjacent the heating zone, and water pipes for cooling the charge below this zone.

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U. S., 1,005,007, Oct. 3. G. E. DUNTON, New York, N. Y. **Treating molds used in electrotyping** with a grease-dissolving substance, *e. g.*, a soln of MeOH, Cl, H_2O, NaCl and HCl, prior to treating it with a conducting substance for the deposition of the metal.

U. S., 1,007,683, Nov. 7. C. ELLIS, Montclair, N. J. **Oxidizing nitrogen** by passing air of constant moisture content concentrically, but not helically, about an elec. arc.

U. S., 1,007,869, Nov. 7. C. W. HILL, Lakewood, Ohio. **Electrode for flaming arc lamps,** having incorporated in it different substances each producing a different characteristic color of the flame so that a succession of color changes are imparted to the arc as the electrode is consumed.

U. S., 1,007,897, Nov. 7. G. O. SEWARD and F. VON KÜGELGEN, Holcombs Rock, Va. **Electrolytic vessel for producing sodium, etc., having a cathode chamber** into which rises the fused metal liberated at the cathode, and a discharge conduit from the chamber extending vertically downward and having a lip at its top to cause the fused metal overflowing to fall free of the wall of the conduit.

U. S., 1,008,002, Nov. 7. M. W. ALLEN, Lakewood, Ohio. **Making carbon electrodes for electric furnace work** by forming a C electrode with a hole in one end, packing into the hole, while the electrode is green, a plastic graphite mixt., and then curing the electrode.

U. S., 1,008,383, Nov. 14. FIN SPARRE, Wilmington, Del. **Treating oxides of nitrogen in solution to increase their oxygen content** by passing an elec. current through the oxides of N soln. and acidulated H_2O, between electrodes in the separate solns., the current d. on the electrode in the oxides of N soln. being high and that on the electrode in the H_2O being low.

U. S., 1,008,535, Nov. 14. E. G. GILSON, Schenectady, N. Y. **Molded electrical conductor** made by mixing finely divided graphite and finely divided Fe_2O_3 or Fe_3O_4, firing the mixt. to a temp. of about 900° and molding under pressure. The graphite is preferably first fired with K_2CO_3 to purify it and make it more easily compacted.

U. S., 1,008,588, Nov. 14. W. D. COOLIDGE, Schenectady, N. Y. **Tubular filament of tungsten having a slit along one side of the filament.**

U. S., 1,008,762, Nov. 14. W. R. WHITNEY, Schenectady, N. Y. **Pointing a tungsten rod or wire** by dipping its end into fused KNO_3 or $NaNO_3$.

U. S., 1,008,806, Nov. 14. K. FARKAS, New York, N. Y. **Making filaments for incandescent electric lamps** by embedding shaped filaments of refractory material, *e. g.*, W powder, containing a glutinous organic binder in a mixture of oxides of earthy metals, *e. g.*, Al_2O_3 90% and CeO 10%, and heating to about 1200° with exclusion of air to eliminate C and impurities.

U. S., 1,008,807, Nov. 14. *Idem.* **Making incandescent lamp filaments** by embedding shaped W filaments containing an organic binder in Al_2O_3 mixed with some Ce oxide, **heating** *in vacuo* to 815°, introducing O and then heating to about 1200°.

U. S., 1,008,808, Nov. 14. *Idem.* **Drawing fine tungsten wire** by heating it electrically in H, drawing out the heated wire in one direction, heating it again electrically, and drawing it out to a finer degree in the opposit direction.

U. S., 1,008,852, Nov. 14. WM. MORRISON, Des Moines, Iowa. **Storage battery electrode,** comprizing a body of formed active material interpenetrated with and bonded by an adsorbed skeleton, sponge or film of desiccated solute of celluloid.

U. S., 1,008,853, *Idem.* **Storage battery electrode** in which the active material is retained by an adsorbed skeleton of a desiccated and vulcanized solute of rubber.

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U. S., 1,008,854, Nov. 14. *Idem.* **Storage battery electrode in which the active material is bonded by the reaction products of Pb oxides, $CrSO_4$ and glycerol.**

U. S., 1,008,860. F. W. PEEK, JR., Schenectady, N. Y. **Electrolyte for aluminium cells containing borates and tartrates of NH_4 and glycerol.**

U. S., 1,008,927, Nov. 14. K. SCHICK, Siegen, Ger. **Making calcium cyanamide** from carbides and N by gradually adding to the molten carbide flowing out of the carbide furnace, halogen salts, *e. g.*, chlorides, and then, after cooling until solid, pulverizing the mixt. and treating it with N while still red hot.

U. S., 1,009,035, Nov. 21. L. E. BARRINGER, Schenectady, N. Y. **Steam-hardened insulating material** formed of SiO_2, $Ca(OH)_2$ and asbestos and having a metallic conductor embedded in it.

U. S., 1,009,061, Nov. 21. R. FRANK, Grunewald, near Berlin, Ger. **Apparatus for decomposing alkali chlorides,** comprizing a series of amalgamating and deamalgamating compartments alternating with and in communication with one another and each having a horizontal bottom in the same plane, cavities in the bottom of the deamalgamating compartments, mechanism for propelling Hg over the bottom of the compartments without lifting it, including ribbed drums rotating in the cavities, and a conduit for returning the Hg from the last compartment to the first cavity of the series.

U. S., 1,009,133, Nov. 21. H. CROSTON, New York, N. Y. **Electrolytic apparatus** (for decomposing NaCl solns.) comprizing an anode and a tank for the electrolyte, and 2 scrapers arranged to reciprocate horizontally in the tank near its bottom and to be raised to an inoperative position during their return movement.

U. S., 1,009,143, Nov. 21. J. FREY, San Francisco, Cal. **Electrical precipitator and amalgamator,** comprizing a cylindrical anode rotatable about a horizontal axis and a trough-shaped cathode below the anode to contain material, *e. g.*, Hg, forming the real cathode, the trough being arranged to tilt to discharge the material.

U. S., 1,009,291, Nov. 21. G. EGLY, Treptow, near Berlin, Ger. **Arc lamp electrode** consisting of C, light-emitting substances, *e. g.*, salts of rare earths, phosphoboric acid and water glass.

U. S., 1,009,608, Nov. 21. E. WEINTRAUB, Lynn, Mass. **Arc light electrode** having a flexible metallic braided sheath filled with oblong pieces of magnetite placed end to end.

U. S., 1,009,630, Nov. 21. L. E. BARRINGER, Schenectady, N. Y. **Dense, stone-like molded insulating material** containing asbestos and a binder of hydrated Ca silicate, the binder being in excess of any free CaO or SiO_2 which may be present.

U. S., 1,009,625, Nov. 21. W. C. ARSEM, Schenectady, N. Y. **Electric vacuum furnace,** having a heater comprizing graphite grids elec. connected and enclosing a zone to be heated, and a heat-insulating screen surrounding the grids, the screen being in part removable to give access to the heat zone.

U. S., 1,009,705, Nov. 21. F. S. WASHBURN, Nashville, Tenn. **Increasing the yield and improving the quality of calcium cyanamide** during its manuf. by providing a mass of finely divided CaC_2, providing and maintaining free passages for N through and around the mass during the reaction, and heating the mass to the temp. required to produce Ca cyanamide in the presence of free N.

Brit., 7,103, Mar. 21, 1911. GEN. ELEC. CO., Schenectady, N. Y. **Mfg. a boron compound by heating a mixt. of boric anhydride and a reducing agent to a temp. above 1250°.**

Ger., 228,881, Sept. 26, 1909. H. HOBEL and H. SCHAUWERKER, Charlottenburg.

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Production and pasting of accumulator electrodes. The paste is brought into the desired form with the use of rotating app. by centrifugal force or by the methods employed in the pottery trade.

Ger., 228,918, Jan. 14, 1908. H. HELBERGER, G. m. b. H., München. Contact arrangement for introduction of current for the heating of crucibles of conducting material which is switched into the secondary circuit of a transformer. The one contact serves as support for the crucible while the other one, adjustable by a handwheel, etc., and to be joined to the upper edge of the crucible, has notches which can be used to charge the crucible and to watch the fusion process.

Ger., 229,016, June 3, 1908. O. SCHALLER, Streglitz n. Berlin. Production of metallic bodies by pressing together finely divided metals and elec. heating of the same until they sinter. The formed products are placed in an electrolyte, and heated according to the Lagrange-Honos process, as the cathode.

Ger., 229,279, Aug. 1, 1909. E. OUHENBRACH, Hamburg. Production of solid, porous metallic electrodes for secondary and primary cells. Ni, Fe, or other metal powder can be shaped into solid, porous, serviceable electrode plates without the aid of an organic or other binder. The active Ni or Fe powder need not be pressed into perforated pockets or casings. Crystallized or amorphous B is added to the metal powder as the active electrode material, and the compd., mixed with H_2O, after being laid on is dried on the bearer of the compd., and then annealed.

Ger., 229,350, May 21, 1910. AKTIEBOLAGET ELEKTROMETALL, , Stockholm. Controlling electrodes in tilting electric furnaces. The electrodes are suspended on frames on top of the furnace. The driving gear to lower and raise the electrodes or the automatic regulators are arranged in such manner that they do not participate in the movement of the furnace.

Ger., 229,453, June 26, 1909. F. W. MAILAND. Rotating device for electroplating metallic tubes, rods, etc. The holders, serving at the same time as conductors for the objects to be plated, are arranged on endless rotating chains, belts or the like, the driving shafts of which are not in the electrolyte. The horizontal displacement of the chains takes place outside the bath.

Ger., 229,541, Aug. 6, 1909. ACCUMULATEUR TUDOR SOC. ANON., Brussels. Packing process for the transportation of negatively charged storage battery electrodes in the moist state.

Ger., 229,542, Apr. 7, 1910. NYA ACKUMULATOR AKTIEBOLAGET JÜNGNER, Fryscryd, Sweden. Production of an active mass consisting of Fe and Cd for the negative electrodes of alkaline storage batteries. Fe and Cd are simultaneously pptd. electrolytically from a compd. of their solns., the resulting sponge-like alloy is washed, dried, and ground to a powder of suitable fineness. Preferably a conc. soln. of $FeSO_4$ and $CdSO_4$ is employed, whereby the 2 metals are used in the desired proportion. The anodes are Fe and Cd plates, the active surfaces of which are in direct proportion to the equiv. wts. of the metals. After the alloy has been washed, the water is squeezed out in a suitable mold, obtaining thereby hard cakes which are dried at 50–60°. These cakes are ground into a coarse powder and the latter is briquetted and put into the pocket-electrodes, the latter being exposed to the cathode electrolysis in alkali in order to reduce the very small quantities of oxide produced by the washing and drying, when they are ready for use.

Ger., 229,600, Aug. 4, 1908. E. GLOSSIER, Bielefeld. Removing slime from battery cells and at the same time introducing fresh acid.

Ger., 230,051, April 29, 1910. J. W. REID, Newark, N. J. Electric furnace with induction coil sunk into the fused charge. For raising and lowering the freely

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suspended induction coil in which a cooling jacket is provided, a motor-driven device is used, its action regulated by a pyrometer in the furnace.

5. PHOTOGRAPHY.

LOUIS DERR.

Colloid Chemistry and Photography. LÜPPO-CRAMER. Frankfurt. *Z. Chem. Ind. Kolloide*, 9, 73–6.—Liesegang (*C. A.*, 5, 1703) has given the name "Ostwald reifung" to the growth of colloidal particles which results from the difference in solubility between large and small particles of the same material, or growth of the large at expense of the small. The addition of H_3PO_4 to the reduction mixt. in the prep. of colloidal Ag (*C. A.*, 5, 3380) gives a completely different series of colors, the soln. which without H_3PO_4 is green, with it becomes yellow red, yellow red becomes ruby-red, red becomes violet, and violet, blue. Increasing the conc. of H_3PO_4 changes the color toward the blue. If the H_3PO_4 is added after the reduction has taken place it is without effect. Citric acid has the same effect as H_3PO_4, while H_2SO_4, HNO_3, HOAc, $H_2C_2O_4$ and tartaric acid are without effect. Since the color is dependent on the size of the particles, changing from yellow to blue with increasing size, the effect of H_3PO_4 must be due to an "Ostwald growth" and the change takes place only during the process of the reduction. Unlike other acids H_3PO_4 hastens the apparent reduction in the presence of gelatin solns. but not in water solns., which is explained by assuming that the amicroscopic particles first formed are rapidly dissolved and repptd. as submicroscopic particles in the gelatin-H_3PO_4 soln. but not in water. Too great conc. of H_3PO_4 destroys this effect, since the solvent action becomes so great as to make no distinction between the large and small particles apparent. The gelatin used must be free from NaCl; 0.002% NaCl will completely hide the effect of H_3PO_4. *Ibid.*, 9, 116–8.—The myeline or vegetation form frequently noticed when salts of heavy metals are dropped into Na or K water glass was noticed in AgCl residues, containing some gelatin, which had stood for some time. A myeline growth of the Ag halide could be obtained by dropping $AgNO_3$ soln. into a gelatin soln. of the halogen salt. If such a formation is shaken the whole gel coagulates and the membrane breaks into "flocks" which are not easily emulsified again. Such a flocculation can be avoided if instead of $AgNO_3$ the NH_4OH soln. of Ag_2O is used. The NH_3 causes a growth of the particles of the Ag halide, so that it does not coagulate so readily, and is easily emulsified. The Ag halide formed in the presence of NH_3 has so much less sp. surface that it does not form membranes as in the myeline formation. H. ISHAM.

Crystallized Photo-haloids. W. REINDERS. Delft. *Z. Chem. Ind. Kolloide*, 9, 10–4.—AgCl crystallized from NH_3 or strong HCl solns. in the light gives blue crystals of the same form as pure AgCl crystallized in the dark. These colored crystals redissolved in NH_4OH or $Na_2S_2O_3$ leave a black powder amounting to 0.5 to 1% of Ag in the AgCl, but if gelatin is added to the NH_4OH it acts as a colloidator and the photochloride dissolves without residue to a soln. having the color of colloidal Ag. If these crystals are further exposed to light they crumble, leaving crystallin Ag on the surface. AgCl dissolved in $HgNO_3$ at high temps. crystallizes on cooling to yellowish, half-formed crystals, the color of which is not changed by light. Evidently here the colloidal Ag is replaced by Hg or Ag amalgam. Crystallization from a soln. of AgCl and colloidal Ag in NH_4OH gives the same photo-haloid. The colloidal Ag may be prepared by reduction of AgCl in NH_4OH soln. or may be added in the form of "Kollargol." These crystals are much more sensitive to light than colorless AgCl crystals. Gelatin, albumin, agar and 22 out of 38 dyes added to the $2N$ NH_3 soln. of AgCl were found

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in the AgCl crystals, the crystals being from 20 to 90 times higher in dye content than the soln., while the relative amount of gelatin, etc., adsorbed is much less. In every case the resulting crystal is much more sensitive to light than is pure AgCl. The photohalides are solid solns. of colloidally dispersed Ag in crystallin AgCl. H. ISHAM.

WATKINS, A.: **Photography: Its Principles and Applications.** New York: Van Nostrand, 333 pp., $2.00.

U. S., 1,009,100, Nov. 21. P. REHLÄNDER, Charlottenburg, Ger. Assignor to Chem. Fab. auf Actien vorm. E. Schering, Berlin. **Modifying the blue tone of photographic pictures** which have been toned by a bath containing $K_2FeC_6N_6$ and a ferric salt, by treating the toned picture with a soln. containing not more than 5% of thiosulfate and not more than 0.5% $K_2FeC_6N_6$.

Brit., 8,153, Mar. 31, 1911. SOC. ANON. DES PLAQUES ET PAPIERS PHOTOGRAPHIQUES A. LUMIÈRE ET SES FILS, 21 to 25 rue St. Victor, Lyon-Monplaisir, France. Mfg. a **polychrome photographic screen** by first projecting on to a support so as to partially cover the same, a mixt. formed of transparent colored particles of all the colors which are to form the screen with the exception of 1, and subsequently further projecting on to said support finer particles tinted with the remaining color to fill in the interstices between the particles first applied.

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6. INORGANIC CHEMISTRY.

H. I. SCHLESINGER.

Lead Silicates. P. WEILLER. *Chem. Ztg.*, **35**, 1063–5.—A study of the fusion diagram of PbO–SiO_2 mixt., of the reduction temps. of the products as compared with that of PbO, and of their sp. gr. and indices of refraction, led to the conclusion that $PbSiO_3$ is the only well defined silicate that was obtained, that an acid silicate of Pb, $PbSi_2O_5$, was probably formed but no orthosilicate or basic silicate. The thermal analysis alone hardly gave conclusive results. The article contains numerous suggestions regarding elec. furnaces and the manipulation of melts. D. M. LICHTY.

Tetramethylammonium Hyponitrite and its Decomposition by Heat. P. C. RAY AND H. K. SEN. Presidency Coll., Calcutta. *J. Chem. Soc.*, **99**, 1466–70; *Proc. Chem. Soc.*, **27**, 121; (cf. *C. A.*, **5**, 3053).—The salt is made by triturating $Ag_2N_2O_2$ and $N(CH_3)_4I$ with addition of a little water, and then filtering out the AgI. Evapn. over H_2SO_4, of the soln. obtained, causes partial hydrolysis so that a basic salt crystallizes. This melts at 55–60° and begins to decompose at 75–80°. The gaseous products formed are N_2, N_2O, $N(CH_3)_3$ and Me_2O. A small fraction of the hyponitrite is converted into nitrate. D. M. LICHTY.

The Constitution of the Heteropoly Acids. ARTHUR ROSENHEIM, J. PINSKER, R. HABERLE, AND R. BILEK. Wiss. Chem. Lab., Berlin. *Z. Elektrochem.*, **17**, 694–9; cf. *C. A.*, **5**, 1884.—From the neutralization curve of *nonotungstophosphoric acid*, $H_{10}[P_2(OH)_2(W_2O_7)_6].25H_2O$ and from the cond. of the guanidine salt, prepd. by dissolving 1 mol. of the acid in 5 mol. NaOH and pptg. with excess guanidine carbonate, the authors conclude that the above is a pentabasic acid. By pptg. a soln. of 3–4 mols. MoO_3 in 1 mol. H_3AsO_4 with conc. HNO_3, *trimolybdenoarsenic acid*, $H_3[AsO(MoO_4)_3]$ $7H_2O$, white powder, forming white prisms from H_2O, is obtained. Its neutralization curve and the cond. of its guanidine salt show it to be tribasic. By satg. a b. soln. of $Na_2(MeAsO_2)$ with MoO_3 and adding guanidine chloride, *guanidine hexamolybdenomethylarsenite*, $(CN_3H_6)_2H_2[AsMe(Mo_2O_7)_3]11H_2O$, is obtained in glittering prisms.

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Similarly, from $Na(AsMe_2O_2)$ the *salt* $(CN_2H_3)_2H[AsMe_2(Mo_3O_7)_2].2H_2O$ is obtained. The basicity in the latter case does not agree with the authors' hypothesis.

GEORGE W. MOREY.

Preparation of Alcoholic Potash. H. MALFATTI. *Z. anal. Chem.*, **50**, 692–3.—The prep. consists in rubbing ignited CaO in a mortar with the KOH, having the former slightly in excess. A little EtOH is added to keep down the dust. The mixt. is then transferred to a flask and shaken with more EtOH till all the KOH is dissolved. The decanted liquid will preserve its strength and color remarkably well. L. J. ROGERS.

Cerium-Tin Alloys (VOGEL). 9. The System: Sulfur-Tellurium (CHIKASHIGE). 9. The System: Selenium-Antimony (PELABON). 9.

BARRE, M: **Contribution a l'étude des sels doubles formés par les sulfates peu solubles avec les sulfates alcalins.** Paris: 8°, 173 pp.

LUDLAM, E. B.: **Outlines of Inorganic Chemistry.** London: E. Arnold, 8°, 382 pp., 4s 6d.

ROSCOE, H. E. AND SCHORLEMMER, C.: **Treatise on Chemistry.** 4th Ed., Vol. I. London: $5.50.

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7. ANALYTICAL CHEMISTRY.

E. G. R. ARDAGH.

Louis Troost. G.-F. JAUBERT. *Rev. gén. chim.*, **14**, 301–9. J. J. M.

Report of the Committee on Quantitative Methods. F. O. TAYLOR. *J. Ind. Eng. Chem.*, **3**, 866–8.—Assay processes for Hg and Zn are given, as well as criticisms of both methods. R. A. CUNNINGHAM.

Method for Filtration. H. DURAND. *J. Ind. Eng. Chem.*, **3**, 872.—A method is indicated for hastening filtration. R. A. CUNNINGHAM.

Decomposition and Preservation of Sodium Sulfite Solutions. ANON. *Brit. J. Phot.*, **58**, 622–3, 678–9, 718–20, 739.—Four 0.1 *N* samples of the photographic salt, after standing 4 years, and 4 months, showed no trace of sulfite remaining. Normal solns. without preservative were either exhausted or showed only a few % of sulfite remaining, except 1 sample which retained 73% unaltered. Mannitol, alc., glycerol and Na_2CO_3 as preservatives failed with 0.1 *N* solns., but preserved 82–94% unaltered with solns. of *N* strength. The exhausted solns. contained Na_2CO_3 and sometimes NaOH. The amount of carbonate in fresh solns. may be as much as 5%. An acidimetric and iodimetric method suggested for the detn. of carbonate, bicarbonate, sulfite, sulfide and thiosulfate in a single sample of soln. is described. L. DERR.

Determination of Magnesium in the Form of Magnesium Oxide. O. KALLAUNER. *Chem. Ztg.*, **35**, 1165–6.—$MgCl_2$ cannot be completely converted into MgO by simple ignition [see PFEIFFER (*C. A.*, **3**, 1380); EMDE and SENST (*C. A.*, **4**, 434), MOLDENHAUER (*C. A.*, **1**, 809)], nor by a single ignition nor by even a double ignition with HgO (BERZELIUS, also VOLHARD, *Ann.*, **198**, 231). About 0.5 g. $MgCl_2$ by ignition for 30 min. or longer over a Teclu burner always contained a fraction of a mg. of $MgCl_2$, by a single ignition with HgO 1 to 2 mg. $MgCl_2$, and by a double ignition about 0.5 mg. $MgCl_2$ remained in the residue. These results are, however, good enough for technical work. E. G. R. ARDAGH.

Modified Cobalt Reaction for the Detection of Minute Amounts of Hydrogen Peroxide. M. LEUCHTER. *Chem. Ztg.*, **35**, 1111.—The claim of von Sobbe that be

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was the originator of the Zn-iodide-starch and the ammoniacal-$AgNO_3$ tests for H_2O_2, is untenable (cf. *C. A.*, **5**, 3774). L. gives a modification of Lenz and Richter's test (*C. A.*, **5**, 3549) for "perboric acid and several similar compds." by means of which very small amts. of H_2O_2 can also be detected. *Method:* Make up (1) a 1% soln. of $CoCl_2.6H_2O$ and (2) a soln. of 1.6 pts. borax, 20 pts. glycerol (28° Bé. D. A. B. V.), and 100 pts. H_2O. Mix (1) and (2) in equal proportions. The glycerol gives a mixt. of higher d. than the liquid to be tested which consequently forms a layer above it, and also prevents a ppt. forming when (1) and (2) are mixed. Place 1–2 cc. of this prep. in a narrow test tube and add gently an equal vol. of the liquid to be tested. A brown to black-brown sepn. layer forms. As little as 1 drop of 3% H_2O_2 in 100 cc. H_2O can be detected by testing 1 cc. of this very dil. soln. as above; 1 cc. of 0.05% $NaBO_3$ also gives a distinct brown zone. For persulfates the soln. should be warmed, and if necessary a little NaOH added. E. G. R. ARDAGH.

Assay of Platinum. A. STEINMANN. *Eng. Mining J.*, **92**, 1030.—To avoid the inaccuracy due to the use of b. conc. H_2SO_4 in parting the PtAg button in the assay of Pt the following method is proposed: About 250 mg. of the Pt alloy are mixed with 5 times the amt. of Ag, Cu (a quantity equal to that of the Pt) and Pb, cupelled at a comparatively high temp., and the residue is fused 3–5 min. The resulting button is rolled and heated for 15 min. with diluted H_2SO_4 (100 parts conc. H_2SO_4 to 22 parts of H_2O) at a temp. not exceeding 240° C. The treatment with acid is repeated twice, and the residual Pt is washed, dried and weighed. ROBERT KANN.

Method of Analyzing some Commercial Gold Alloys. Metals Present: Gold, Silver, Copper and Occasionally, Zinc and Tin. J. O. HANDY. *J. Ind. Eng. Chem.*, **3**, 804–5.—A systematic scheme for the complete analysis of such alloys is given. R. A. CUNNINGHAM.

Assay of Gold Solutions. C. CRICHTON. *Eng. Mining J.*, **92**, 980–1; *J. Chem. Met. Soc. S. Africa*, **12**, 90–2.—A method of assaying Au-bearing CN solns. by electrolysis has been for some time in vogue on the Rand. Ordinary $^5/_{16}$ in. arc lamp carbons are used as anodes and the cathodes are made from assay Pb foil, a suitable length being 9 in. Three 2-volt accumulator cells connected in series give a terminal pressure of about 6 volts. The time required for the complete deposition of the Au is 4 hrs., after which period the Pb cathodes are disconnected and removed to a hot plate to dry. Then they are folded into a small compass and cupelled with a little Ag, parted and weighed. (Also in *Mining Sci. Press*, 103, 710.) ROBERT KANN.

Modification of the Gold Dust Test. R. STERNER. *Oesterr. Z. Berg. Huettenw.*, **59**, 461–2.—To avoid losses in parting Au and Ag, the following procedure is recommended: Treat the hammered-out button with HNO_3 of 32° Bé., boil, fill with dist. water and allow the finely divided Au (dust) to settle. Pour off soln. carefully into another flask and fill the first one with water again. Then add a few drops Hg and boil until a uniform amalgam is obtained. Pour off $AgNO_3$ and boil the amalgam with conc. HNO_3 to dissolve Hg. Dilute with water and decant off soln. when pure Au sponge remains, which is dried and ignited in the usual manner. E. J. ERICSON.

The Assay of Used Plumbago Crucibles for Gold. JOHN WATSON. *J. Chem. Met. Min. S. Africa*, **12**, 53–8.—Discussion and reply. L. J. Wilmoth. Mr. Watson's method is complicated. The Dures method is generally used. This is: Plumbago crucible 5 g., Na_2CO_3 25 g., borax 15 g., PbO 85 g., KNO_3 7 g., SiO_2 10 g. An improvement consists in substituting Pb_3O_4 for the KNO_3. "Metallics" (scales) have to be sepd. in assays of this kind. In his experience the plumbago crucible itself, after scraping off slag, etc., never assayed under 9.2 oz or over 9.5 oz. This point suggests a possible chem. explanation. In comparing scorification with fusion methods for

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this material, the av. of 6 scorifications gave the ratio of 1 Au : 1.70 Ag. Av. of 6 fusions (Dures flux) 1 Au : 1.23 Ag. In every case 0.2 A.T. of plumbago crucible was used. Direct fusion with Dures flux seems best to det. Au, and scorification to det. Ag. Mr. Watson in reply states that the Dures flux without addition of a reducer, does not give a good-sized Pb button. He gives the results obtained on the same sample by the 8 different methods proposed or used on the Rand. E. J. ERICSON.

Determination of Silicon in Crude Irons Rich in Graphite. C. REICHARD. *Pharm. Zentralhalle*, **52**, 939–40.—Complete soln. of samples of Fe rich in graphite can not be obtained with HNO_3. By heating 1 g. of the powdered sample in Pt over blast lamp for 15–30 min. the greater part of the Fe will dissolve in 25% HCl. After the soln. is poured off the residue is treated with fuming HNO_3, the acid solns. are combined, and the graphite filtered off. The filter and contents are dried and ignited in porcelain in a current of O. To any residue thus obtained is added the SiO_2 sepd. from the acid soln. in the usual manner. A. VORISEK.

Contribution on Ultimate Analysis. ALBIN KURTENACKER. Chem. Lab., Tech. Hochsch., Brun. *Z. anal. Chem.*, **50**, 548–65.—Expts. were conducted with various metallic oxides to det. their efficiency as O carriers in ultimate analysis. Fe_2O_3 gave unsatisfactory results. Mn_2O_3, obtained by ignition of the nitrate, gave good analytical results for C and H, but on account of the difficulty with which the nitrate is decomposed when ignited, this oxide is unsuitable for N detns. NiO, WO_3 and MoO_3 are unsuitable on account of their tendency to be reduced. Cobaltocobaltic oxide, Co_3O_4, is the most satisfactory of the oxides investigated, being equal if not superior to CuO. The porous Ni prepared by reducing NiO with H was then tried as a reducing agent for N oxides. Preliminary tests showed that Ni reduces small amts. of CO_2, but the error caused by this reduction can be entirely eliminated by placing some Co_3O_4 between the Ni and the azotometer. It was also shown that the total N oxides formed during combustion are reduced, and that by the preliminary reduction of the Ni little or no H is introduced by occlusion. When using Ni some Co_3O_4 should be placed between the Ni and the azotometer to oxidize the small amts. of CO and H formed by the reduction of CO_2 and H_2O. Co was also obtained in a porous condition by reducing Co_3O_4 tested. CO reduces CO_2 and H_2O to an appreciable degree, and during its preliminary reduction considerable H is occluded. D. BREESE JONES.

The Accuracy of Nitrate Determinations. S. SEYDEL AND L. WICHERS. Landwirtz bact. Inst., Univ. Göttingen. *Z. angew. Chem.*, 24, 2046–54.—Expts. were carried out on different methods with the following results. Reduction in alk. soln. is good for 15–30 mg. nitrate N in the quantity tested. With 40 mg. or more of nitrate N even in pure KNO_3, the method cannot be used. Errors are still greater in soil exts. Too little nitrate N is always obtained in presence of urea, asparagine or peptone, which give off NH_3 with NaOH. The authors could not confirm the view of Densch that in soil exts. NH_3 is given off from the sol. organic matter by NaOH. Probably less appears in this detn. due to organic substances hindering the reduction or preventing the distillation of NH_3. Reduction in acid soln. by the method of Ulsch in not too dil. soln. is better than in alk. soln. Schlösing's method gave very good results except in the presence of urea. The nitro-method probably gave somewhat too little nitrate N but proved excellent in presence of organic substances (asparagine, etc.). Some of the above direct methods are always available; indirect detn. which Densch recommends gives cumulative errors. JOHN WADDELL.

A Study of the Bromine and Iodometric Methods for the Determination of Resorcinol. C. M. PENCE. Research Lab. Lilly & Co., Indianapolis. *J. Ind. Eng. Chem.*, 3, 820–2.—The success of the method depends upon the proper length of time given for

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the reaction of the different reagents and on their proper diln. The best method of procedure is given in detail and 72 expts. are recorded. JOHN WADDELL.

The Quantitative Determination of Water in Substances by means of Alkyl Magnesium Halogen Compounds. TH. ZERREWITINOFF. *Z. anal. Chem.*, **50**, 680–91.—The method depends on the fact discovered by Grignard that $MgCH_3I$ reacts with water giving methane. This reaction is made to take place quant., according to the equations: $Mg(CH_3)I + H.OH = CH_4 + Mg(OH)I$, $Mg(OH)I + Mg(CH_3)I = CH_4 + MgI_2 + MgO$ The amt. of methane evolved is measured, and the corresponding amt. of water calc. Hydroxy compds. in general as alc., phenols, acids, oximes, sugars, flavones, alkaloids, also react quant. with $MgCH_3I$. By this method the number of hydroxyl groups present in such compds. may be exactly detd. Likewise thiohydroxy compds. as mercaptans and thiophenols also primary and secondary amines react quant. with $MgCH_3I$. For the quant. estn. of the hydroxyl, thiohydroxyl, amino and imino groups, the compd. is dissolved in some solvent which also dissolves the $MgCH_3I$, but does not react with it. For this purpose amyl ether, pyridine, xylol, mesitylene and anisole are suitable. Free water can be detd. in compds. containing any of these groups by choosing a solvent for the $MgCH_3I$ in which the substance is insol. In such a case only the free water reacts and can be accurately detd. Analytical results of the detn. of water in coal by this method and by the 3 other known methods, *viz.*: (1) drying in oven at 100-110°; (2) drying in vacuum desiccator over H_2SO_4 at ordinary temp. (3) drying in a stream of H at 100–110° and catching the water expelled in a weighed $CaCl_2$ tube are given. By (1) it is impossible to get accurate results owing to the escape of other volatil compds. and to partial oxidation of C to CO_2. The chief objection to (2) is its slowness, while (3), although it gives very accurate results is too complicated and tiresome. The $MgCH_3I$ method can be carried out in less than an hour. The duplicate detns. of water in a series of coals gave very concordant values, but in every case less than the values obtained by the other 3 methods. The methods for the estimation of water in starch are also compared with this new method.

M. C. BOSWELL.

New Bromine Method for the Determination of Aromatic Phenols. Its Special Application to Thymol. A. SEIDELL. *J. Wash. Acad. Sci.*, **1**, 196–8.—The modification of the Br method consists in adding a small amt. of CS_2 to prevent too vigorous action of the Br on the thymol, in order to avoid high results. Place 0.1–0.5 g. of the thymol in a 200 cc. glass stoppered bottle with 5 cc. CS_2 and about 100 cc. H_2O. Pour in Br vapor till the color after thorough shaking shows the presence of a considerable excess of Br. After 30 min. add an excess of 10% KI, and titrate the liberated I with 0.1 *N* $Na_2S_2O_3$. Add an excess of KIO_3 (approx. 5%) and titrate with 0.1 *N* $Na_2S_2O_3$ to det. the free HBr. By calc. 2 mols. HBr to 1 mol. thymol, the amt. of the latter is directly obtained. The CS_2 is an excellent solvent for thymol, and can consequently be employed for extraction. E. G. R. ARDAGH.

A Method of Determining Carbon and Nitrogen in Organic Compounds. EDWARD P. FRANKLAND. Univ. of Birmingham. *J. Chem. Soc.*, **99**, 1783–5; *Proc. Chem. Soc.*, **27**, 207.—The method is an application of the Frankland-Armstrong vacuum combustion process for the detn. of minute quantities of C and N in H_2O, to a detn. of C and N in organic compds. A weighed quantity of the substance is mixed with fine CuO and introduced into a combustion tube closed at one end which is then filled with coarse CuO to the usual length; a reduced Cu spiral is fitted in and the tube is then drawn out, attached to a Sprengel pump and exhausted. During the last stages of the exhaustion, some burners are lighted under the Cu spiral. The combustion is carried out in the ordinary manner and the gas evolved collected over Hg, in a glass vessel graduated in tenths of a cc. and closed by a tap at the upper end. When the

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gas has ceased to pass over, the combustion tube is thoroughly exhausted and the measuring vessel transferred to a cylinder of Hg. The temp. is read off by a sensitive thermometer, and the vol. of the gas at atmos. pressure through a telescope. This gives the vol. of moist CO_2 and N. The gas is now treated with an aq. soln. of KOH to absorb the CO_2. When the liquid has remained at the same level for 10 min. with occasional shaking, the KOH soln. is diffused into H_2O free from dissolved air. The N is then forced through the tap in the top of the cylinder into a narrow glass measuring tube graduated in tenths. The N is then measured over H_2O, and the N and CO_2 calc. from d. tables. The results so obtained are generally more accurate than the av. figures obtained in the ordinary C–H combustion process, and are not affected by the presence of halogens. A. V. DE LAPORTE.

The Detection of Carbon Monoxide by means of Blood. H. FRANZEN AND O. VON MAYER. *Z. anal. Chem.*, 50, 669–79.—The sensitiveness of the several methods for the detection of CO by means of blood are compared, and the following conclusions obtained. The Hoppe-Seyler NaOH method shows a color difference with a content of 10% CO in blood while the Salkowski modification of this method is much sharper and is capable of indicating 1% CO in blood. The Salkowski H_2S test and the Rubner PbOAc test show a color difference in blood containing 5% CO. The $K_4Fe(CN)_6$ and tannin methods are much sharper being capable of detecting 1% CO in blood. The Schulze modification of the tannin method is not to be preferred to the original method. The tests of Zaleski, Landois, Howszkiewicz and Marx are not considered in the detection of small amts. of CO. The most sensitive methods are the Salkowski modification of the Hoppe-Seyler method, the $K_4Fe(CN)_6$ method and the tannin method all of which are capable of indicating the presence of 1% CO in blood. As the tannin test requires many hrs. standing before the color difference develops the first 2 of these are recommended. M. C. BOSWELL.

Colorimetric Examination of Alcohol in Acetone. Color Reactions of Certain Organic Groups in the Presence of Mineral Acids and Potassium Dichromate. H. AGULHON. *Bull. soc. chim.*, 9, 881–5.—A. suggests the substitution of HNO_3, H_3PO_4 or $KHSO_4$ for the H_2SO_4 in the chromic acid mixt. when estg. colorimetrically, alc. in presence of acetone. The HNO_3 soln. is prepared by dissolving 0.5 g. of $K_2Cr_2O_7$ in 100 cc. com. HNO_3. Best proportion to use is 3 cc. of the soln. to 1 cc. or a crystal of the unknown. Excess of H_2O or $K_2Cr_2O_7$ is to be avoided. This in the cold, gives a blue color, with aldehydes, alcs., sugars, mannitol and aliphatic hydroxy acids; also with the unsatd. fatty acids, but not with the ketones of the aliphatic series. In the aromatic series only ketones in the series of cyclohexanes give the coloration. Heating the reagent spoils it, as ketones then give the coloration which is green. The H_3PO_4 soln. is prepared by adding 3 parts of the acid to 1 part of a 2% soln. of $K_2Cr_2O_7$. This reagent is less sensitive than the first, and the coloration is green in hot or cold soln. The $KHSO_4$ soln. is prepd. by dissolving 50 g. $KHSO_4$ in 50 cc. H_2O containing 0.5 g. $K_2Cr_2O_7$ in soln. The reagent is used at a b. temp. and the coloration is green. It is the least sensitive of the 3 but is commended because it does not give any coloration with unsatd. substances and can be used in the analysis of oils.

R. A. CUNNINGHAM.

Determination of Casein in Milk (HALPHEN). 12. Determination of Dextrin in Beer (POZZI-ESCOT). 16. Preparation of Alcoholic Potash (MALFATTI). 6. Electrolytes of Lead Storage Batteries (LUCHINI). 4.

BERINGER, C.: **Text-book of Assaying.** 12th Ed. London: 8°, 468 pp.

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GRAMONT, A. DE: **Notions d'analyse spectrale appliquée aux essais industriels.** Paris: 8°, 32 pp., 1.50 Fr.

LUNGE, G.: **Technical Methods of Chemical Analysis.** Vol. II. Translation. London: Gurney & Jackson, 8°, 1294 pp., $15.75.

MERMET, A.: **Manipulations de chimie.** Paris: 8°, 600 pp.

POST, J. AND NEUMANN, B.: **Traité d'analyse chimique appliquée aux essais industriels.** Paris: 8°, 492 pp., 10 Fr.

SMITH, E. F.: **Electro-analysis.** 5th Ed. Philadelphia: Blakiston, 8°, 332 pp., $2.50

STUCKERT, L.: **Ueber die Lichtbrechung der Gase und ihre Verwendung zu analytischen Zwecken.** Karlsruhe: 8°, 40 pp., 2 M.

WINAWER, B.: **Analyse quantitative volumètrique.** 2nd Ed. Paris: 8°.

8. MINERALOGICAL AND GEOLOGICAL CHEMISTRY.

ROGER C. WELLS.

Elba Topaz. UGO PANICHI. *Atti accad. Lincei*, 20, II, 279–83.—This mineral (cf. Corsi, *Riv. sci. ind. Firenze*, 12, 137) exists in crystals of 2 habits; one does not show the rudimental forms described by Corsi but does show a form (1$\bar{1}$0) in which x is very nearly if not equal to 5; another form corresponds very closely to (11.8.$\bar{1}$0). In all, 16 forms were observed. As an av. from measurements of the various angles, $a : b : c =$ 0.53016 : 1 : 0.95215. CHAS. A. ROUILLER.

Photographs of Polished Thin Sections from the Mineralogical Institute of the University of Leipzig. NAUMANN. *Chem. Zig.*, 34, 1094. E. J. WITZEMANN.

The Occurrence of Tridymite in Inclusions in the Lava of Mt. Etna. F. STELLA-STARRABA. Palermo. *Centr. Min.*, 1911, 627–9.—Fragments of quartz-sandstone have been altered almost completely into tridymite. E. T. WHERRY.

Specific Heats of Barytes, Witherite, Fused Lime, Quartz and Chalcedony at High Temperatures. P. N. LASHCHENKO. Phys. Chem. Lab., Don Polytechn. Inst. *J Russ. Phys. Chem. Soc.*, 42, 1604–14.—Tables and curves are given for the sp. heats of the above substances at different temps. The results show that, with the exception of barytes, they all undergo transformation into polymorphous modifications at certain temps. These temps. and the corresponding heats of transformation in cal. per g. mol. are as follows: Witherite, 800–10°, 1750; fused lime, 400–15°, 230; chalcedony 224°, 523; quartz, 580–600°, 181. H. M. GORDIN.

Composition of a Radioactive Caucasian Mineral. N. SOKOLOV. Lab. Imper. Russ. Techn. Soc. *J. Russ. Phys. Chem. Soc.*, 43, 439–40.—A dark sample resembling pitchblende and possessing considerable radioactivity had d^{18} 6.4, and contained U_3O_8, 76.01%, S, 1.7% and 20% residue insol. in HNO_3 and Na_2CO_3. This residue gave in %: SiO_2, 5.17; Pb, 4.5; $Fe_2O_3 + Al_2O_3$, 4.3; MnO, 0.155; Zn, 0.166; CaO, 4.1; MgO, 0.203. H. M. GORDIN.

The Mean Specific Heats of Silicates in the Crystallin and Amorphous Conditions between 20 and 100°. KARL SCHULZ. Min.-petr. Inst., Univ. Berlin. *Centr. Min.*, 1911, 632–40.—The sp. hts. of adularia, microcline, spodumene and $PbSiO_3$ were detd. on crystals and on the glasses formed by their fusion, the latter yielding the higher values in every case. E. T. WHERRY.

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The Isomorphous Mixed Salts of the Water-free Calcium, Magnesium and Iron Carbonates. W. DIESEL. Jena. *Z. Kryst. Min.*, 49, 250–77.—Fe carbonate shows a greater inclination to form mixed salts with $CaCO_3$ than does $MgCO_3$. Ca and Fe carbonates form homogeneous mixed salts in all proportions, while $MgCO_3$ is miscible with the others to only a slight extent. When a soln. containing salts of Ca, Mg and ferrous Fe is treated with $(NH_4)_2CO_3$ all of the Fe is pptd. while some of the Ca and much of the Mg remain in soln. When a soln. of ferrous Fe is treated with a mixt. of $CaCO_3$ and $MgCO_3$, the $MgCO_3$ ppts. the Fe more rapidly than does the $CaCO_3$. Of the 3 modifications of $CaCO_3$ vaterite ppts. ferrous Fe most rapidly. $CaCO_3$ occurs in the mixed carbonates as vaterite. The pptd. mixed carbonate consists of spherulites which are sharply bounded and well formed where much Fe is present, but with decrease of Fe they are more irregular and indistinct. The spherulites are optically negative. E. S. LARSEN.

The Tertiary Gravels of the Sierra Nevada of California. WALDEMAR LINDGREN. U. S. Geol. Survey, *Prof. Paper* 73, 226 pp., maps.—This report traces the history of the Sierra Nevada and deals especially with the origin of the Au-bearing gravels. The occurrence of Au in the gravels in paying quantities is limited almost entirely to those in which quartz and metamorphic rocks form the chief components. This distribution is strictly dependent on the presence of primary deposits of Au in the pre-Tertiary rocks, the Paleozoic and Mesozoic sedimentaries and the igneous rocks associated with them which were erupted and metamorphosed before the principal intrusion of the great granitic masses occurred. The latter are almost wholly barren. R. C. WELLS.

Geology and Ore Deposits near Lake City, Colorado. J. D. IRVING AND H. BANCROFT. U. S. Geol. Survey, *Bull.* 478, 128 pp.—Both geologically and with reference to the ore deposits the Lake City region is closely related to the adjacent quadrangles which have been described in previous bulletins. The veins differ from the Ouray, Telluride and much of the Silverton region in being in an older series of rocks and in the absence of the San Juan tuff. Tables are given comparing the minerals in these various districts arranged in classes by zones of occurrence. The mines are described with mineralogical detail. R. C. WELLS.

Red Earth (Pozzolana) of Catania. E. MANZELLA. *Riv. mat. Costruz.*, 8, 211–6; through *Rass. min.*, 35, 162–3.—This material, which is the result of a double phenomenon of metamorphism of eruptive rocks—the first due to the action of external agents, the second to the heat of later lava flows—is found in sandy layers 0.5–3.0 m. thick, always covered with a layer of basaltic lava: d_{15} 2.68; no. of particles per 1,000 having a mean diam. of 5–2 mm., 161; 2–1.5, 166; 1.5–1, 188; 0.5, 178; < 0.5, 307: comp.; loss on ignition, 0.90; SiO_2, 51.84; Al_2O_3, 21.94; Fe_2O_3, 9.79; CaO, 7.15; MgO, 1.90; Na_2O, 3.81; K_2O, 2.09; SO_3, 0.28: CaO absorbed by 100 pts. (granules 0.5 mm. in diameter); 1 min., 0.70; 1 hr., 0.70; 5 hrs., 0.70; 1 d., 0.90; 2 ds., 1.10; 5 ds., 1.90; 10 ds., 2.80; 30 ds., 4.80; 40 ds., 5.80; 80 ds., 6.20; 100 ds., 7.80. The mortar has a greater tensil strength, but resists pressure less well, especially if immersed in H_2O, than that made from other typical Italian pozzolanas. CHAS. A. ROUILLER.

Determination of the Inorganic Colloid Content of Decomposed Rocks and their Rearranged Argillaceous Products. H. STREMME AND B. AARNIO. Berlin. *Z. prakt. Geol.*, 19, 329–49.—The properties of colloids, with special reference to their occurrence in soils, are reviewed, and the methods for their detn. compared. That of Van Bemmelen (b. with strong acids and analyzing sol. and insol. portions) was unreliable, for some colloids were not dissolved while some cryst. compds. were. The Ashley absorption method, using methylene blue, gave better results, while the Rodenwald-Mitscherlich hygroscopicity detn. was most satisfactory of all. E. T. WHERRY.

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Some Ore Deposits at Sichota-Alin, East Siberia. OSKAR WEIGEL. Min. Inst., Univ. Göttingen. *Centr. Min.*, 1911, 630–2.—Sulfides occur at the contacts of andesite and other igneous rocks with the limestone of the region. E. T. WHERRY.

Fluorspar Mining at Rosiclaire, Ill. E. F. BURCHARD. *Eng. Mining J.*, 92, 1088–90.—Flourspar occurs associated with Pb and Zn in fault fissure veins. ROBERT KANN.

The Coal Seams in the Molasse Formation at Bregenz. C. SCHMIDT AND FR. MÜLLER. Geol. Inst., Univ. Basel. *Z. prakt. Geol.*, 19, 355–9.—Analyses. E. T. WHERRY.

The Seekaar Copper Mine, Tauern, Salzburg. KARL A. REDLICH. Montanist. Hochschule, Leoben. *Z. prakt. Geol.*, 19, 350–5.—Veins in cryst. schists carry chalcopyrite, tennantite and ankerite in 2 generations, the older containing 13% $FeCO_3$, the younger over 70%. E. T. WHERRY.

Electrical Conductivity of Rocks (LÖWY). 2.

U. S., 1,004,505, Sept. 26. A. V. L. VERNEUIL, Paris, France. **Synthetic sapphire** containing Al, Fe and Ti and having beneath its surface bubble-like spots bounded by rounded walls, and having the same color transparency and hardness as the natural sapphire; made by fusing together oxides of Al, Fe and Ti in the proportions of 98%, 1.5% and 0.5%, resp.

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9. METALLURGY AND METALLOGRAPHY.

WILLIAM BRADY, WILLIAM T. HALL.

The Thames Iron Works and Industrial Economics. ANON. *Engineering*, 92, 672–3. E. J. C.

The Martin Process. F. SCHEFCHEN. *Chimiste*, 2, 273–4.—A summary of the well known advantage of using hot metal (direct from blast furnace) in open-hearth practice, thereby effecting a saving in fuel, time, wages, greater output and a higher yield of metal. E. J. ERICSON.

The Composition of the Gas Current in the Blast Furnace. M. LEVIN AND H. NIEDT. *Metallurgie*, 8, 515–9, 556–81.—A very complete investigation. The results are tabulated and illustrated by numerous curves. W. T. H.

Direct and Indirect Reduction in the Iron Blast Furnace. M. LEVIN. *Metallurgie*, 8, 606–13.—If the flue gas contains 53 vol. or more CO to 100 vol. N, indirect reduction alone is impossible. If the ratio is less than 53 CO to 100 N, indirect reduction can take place entirely and half the difference between 53 and the amount of CO accompanying 100 vols. N is a measure of the maximum quantity of O produced by direct reduction of the ore. The equation $2\ CO = O + CO_2 + 38.96$ cal tends to equalize the difference in the amt. of heat evolved by direct, indirect of mixed reduction of the Fe oxide. CARLE R. HAYWARD.

The Development of Zinc Blend Roasting. E. SCHÜTZ. *Metallurgie*, 8, 635–45.—S. points out the disadvantages of the old hand furnaces and describes the development of the mechanical furnaces with the advantages of the different designs. The field is being actively investigated to-day with the object of obtaining a more thorough and uniform roast and of utilizing the gases. The use of steam for decomposing sulfates has met with some success. CARLE R. HAYWARD.

The New Plant of the Vanadium Metals Company at Groton, Conn. G. L. NORRIS.

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Brass World, 7, 383–7.—This plant is specially equipped for the manuf. of non-ferrous V alloys. The V used is either in the form of ferrovanadium or cuprovanadium. The company owns large V deposits in Peru. ROBERT KANN.

Some Analyses of Different Grades of Commercial Pig Tin. ANON. *Brass World*, 7, 396.—22 complete analyses of com. pig tin show Sn content of 95.28%–99.96%. ROBERT KANN.

Cyanide Plants in the Black Hills, South Dakota. ANON. *Eng. Mining J.*, 92, 1038. R. K.

The Ajax Mill, Victor, Colorado. ANON. *Eng. Mining J.*, 92, 1077–8.—The Moore-Chancy process consists in using a complex soln. composed of Ca cyanamide KCN, KCNS and KI and electrolyzing the mixt., thereby generating among other compds. the halogen cyanide necessary to break up the telluride minerals. R. K.

Huff Electrostatic Plant in Mexico. F. L. MACGREGOR. *Eng. Mining J.*, 92, 1080–1.—The Cu-Zn middlings which formerly could not be utilized are now treated by electrostatic sepn. The Zn product obtained by this process avgs. 5% Zn and 5% Fe, and the Cu product 9% Zn, 16% Cu and 10 oz. Ag. ROBERT KANN.

The Tonopah Extension Mill. C. T. RICE. *Eng. Mining J.*, 92, 1085–7.—The feature of the mill is the use of the Trent agitator which is described. A direct all-slime cyaniding system has been substituted for the combined concg. and cyaniding method once employed. The Au extraction in a 6-month run is 93.63%, Ag 89.74%. ROBERT KANN.

Recent Progress in the Roasting of Sulfides. L. GUILLET. *Rev. métal.*, 8, 561–605; *Chem. Eng.*, 14, 463–4. J. J. M.

Color of Blue and Black Blast Furnace Slag. H. FLEISSNER. *Oesterr. Z. Berg-Huettenw.*, 58, 75; through *Trans. Inst. Min. Eng.*, 41, 608.—Expts. to det. the presence of ultramarine in blue slag showed its absence, the color being due to the position of the particles which showed blue in bright light and brown in the shadows. The coloring matter of black slag was due to C, ½–1% being sufficient. Blue slag is formed by partial recrystn. of part of black slag and is produced by annealing. A. J. PHILIPS.

The Chemist in the Iron Foundry. WALTHERE DEMARCHE. *Chimiste*, 2, 305–6. The necessity of control by means of microscopic, chem. analysis, etc., in the modern foundry is discussed. L. W. SPRING.

Experiments in the Treatment of Accumulated Ore Slime by Air Lift Agitation. J. E. R. ADENDORFF. *J. Chem. Met. Min. S. Africa*, 12, 52.—Discussion. A. F. Crosse marked that in cyanide work, $CaSO_4$ exercizes a partial dissociating influence, and $MgSO_4$ still more, free HCN, $Mg(OH)_2$ and K_2SO_4 apparently being formed to some extent. In some cases with neutral ores he has found as much as 0.2% $CaSO_4$ in the solns. With a slime apparently the same as that described in the paper, he obtained good results by displacing the soln., (washing) during air agitation. In general he believes that such a procedure gives quicker soln. and higher extraction. E. WALLER.

The Briquetting of Iron Ores. GUSTAV GRÖNDAL. Stockholm. *Stahl u. Eisen*, 31, 537–40.—An account of results by the Gröndal and other processes in various countries. E. J. WITZEMANN.

The Briquetting of Iron Ores. A. WEISKOPF. *Stahl u. Eisen*, 31, 1097–1101.—Correspondence between W. and G. Gröndal (see preceding abstr.). E. J. W.

Recent Development in "Chamber Stones." C. CANARIS. Duisberg-Manheim *Stahl u. Eisen*, 31, 1245–8.—Special forms for greater heat economy in blast furnace operation. E. J. W.

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A Method for Calculating the Carbon Used in Direct Reduction in the Blast Furnace. MATHESIUS. *Stahl u. Eisen*, 31, 1380–3.—A criticism of *C. A.*, 6, 68. E. J. W.

Dimensions of Martin Furnaces on the Basis of Experience. M. A. PAWLOFF. *Stahl u. Eisen*, 31, 1183–6. E. J. W.

Old Iron Smelters of Upper Silesia. EMIL JAGSCH. Middlesbrough. *Stahl u. Eisen*, 31, 1525–34.—Historical with 12 plates of old charcoal furnaces. E. J. W.

Dedication of the Metallurgical Institute of the Kgl. Tech. Hochschule at Breslau. EDIT. *Stahl u. Eisen*, 31, 1565–79.—Ten photos of the labs. E. J. W.

New Studies of the Alloys of Nickel and Zinc. E. VIGOUROUX AND A. BOURBON. *Bull. soc. chim.*, 9, 873–9.—By the analysis of mixts. remaining after treatment with dilute acids, the existence of the compds. $NiZn_4$ and Ni_2Zn is deduced. W. T. H.

The Cementation of Iron by Solid Carbon. G. CHARPY AND G. BONNEROT. *Compt. rend.*, 153, 671–3.—Mild Martin steel was heated to 950° with purified graphite in a rarefied atm. The gas in contact with the metal contained N, H and CO. When the vacuum was very complete, there was no cementation after 38 hrs. heating but as soon as the manometer showed from 0.1 to 0.3 mm. of Hg, this gas pressure was sufficient to introduce 0.5% of C into the Fe. This new series of expts., in which all possible precautions were taken to avoid error, force one to conclude that there is absolutely no cementation of Fe by solid C if the operation is conducted in the absence of any gas capable of acting upon the C or upon the metal. W. T. H.

Tests of Corrosion of Metal Sheets in a Railway Tunnel. A. W. CARPENTER. *Eng. News*, 66, 475.—In the paper read before the Am. Soc. for Testing Materials (see *C. A.*, 5, 3219) in the last series of expts. Nos. 2, 5, 8 and 11 were not exposed 58 d. as stated but only 42 d. A second series of exposure tests has since been completed and after 118 d. exposure the av. losses in wt. in g. per sq. in. were as follows: (1) lead-coated, galvanized steel plates 0.121; (2) special "A" Fe sheets, plain, 0.168; (3) special "B" Fe sheets, plain 0.170; (4) wrought-Fe sheet, plain 0.211; (5) special "A" Fe sheet, galvanized, 0.214; (6) open-hearth soft steel angles, plain, 0.237; (7) special "B" Fe sheets, galvanized, 0.246; (8) open-hearth soft steel sheets, 0.267 open-hearth steel bars, plain 0.278; Bessemer steel angles, plain 0.285; Bessemer steel bars, plain 0.305; special non-ferric metal sheet, plain, 0.421. The calc. rate of corrosion per annum, assuming a uniform rate from the above, would vary in the case of the plain ferric metals from 0.004 in. to 0.007 in. per surface. W. T. H.

The Wear of Rails of Different Grades of Steel. ANON. *Eng. News*, 66, 538–9.—Open-hearth steel appears to be better than Bessemer steel. Expts. with steel subjected to ferro-titanium treatment has given conflicting results and the same is true of Mn steel and Cr-Ni steel. Expts. with alloy steel indicate that at present more attention should be paid to getting good quality rails under present specifications rather than seeking to obtain special grades of steel for severe conditions of service. W. T. H.

The Corrosion of Brass with Special Reference to Condenser Tubes. P. H. BRÜHL. Univ. Birmingham. *Engineering*, 92, 436–8, 472–5; *Metal Ind.*, 9, 429–31, 472–3, 512–4.—After reviewing previous work discussing the theory of corrosion, and pointing out the different types of corrosion, the author gives an account of a number of corroded specimens which he has studied. The use of protective coatings, the effect of strain, of rolling, of annealing, of oil, of stray elec. currents, of polarization and depolarizers and the influence of surface impurities was studied. The conclusions are: (1) that the presence of air or an increase in temp. accelerate corrosion; (2) that Fe, Ni and a little Pb are injurious but Sn up to 1%, large amts. of Pb and Al are useful in diminishing corrosion; (3) that the inlet pipe and condenser plates should be pref-

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erably made of brass and (4) that the condenser should be protected against stray currents. W. T. H.

The Mechanical Influence of Carbon on Alloys of Iron and Manganese. J. O. ARNOLD AND F. K. KNOWLES. Univ. Sheffield. *Engineering*, **92**, 478–9.—Two series of steels were made with Mn varying in each from 1 to 20% and with C about 0.85% in one and under 0.1% in the other. The alloys were obtained in extremes of physical condition by cooling quickly at one time and very slowly at another. The general physical properties, static mechanical tests, dynamic stress-strain tests and microscopic appearance are described. Although C exerts considerable influence upon the properties of steel it would seem as if the chem. and phys. properties were even more dependent upon Mn content. W. T. H.

Temperature Influences of Carbon and Iron. E. ADAMSON. *Engineering*, **92**, 507–9; *Met. Chem. Eng.*, **9**, 598.—Practical experience shows that the detn. of Si alone is insufficient in the chem. grading of pig Fe. C is pptd. free in the absence of Si and the author believes that this pptn. primarily depends upon the original temp. to which the Fe is raised in the blast furnace. The temp. of the furnace decides the fracture of gray pig Fe, as well as the lower grades, regardless of the Si, S, P and Mn content. W. T. H.

The Transformations of Steel within the Limits of the Temperatures Employed in Heat Treatment. L. GRENET. *Engineering*, **92**, 509–11, 541–4.—The transformations which steel undergoes within the limits of temps. ordinarily employed in heat treatment are explained and it is shown how the same conceptions apply to the classification of facts relating to heat treatment of other alloys. Osmond's classification of steel is described and made to include alloys other than steel as well as the high-speed tool steels; the description is illustrated by many typical curves. G. concludes that the Fe-C alloys are like other alloys and no complications due to allotropic modifications of Fe need be taken into consideration. It is easy to represent by simple diagrams the way in which special elements influence the temp. of transformation on cooling. Quenching may change the nature of the constituents by preventing wholly or partly the transformations on cooling or it may serve to lower the temp. of the transformation on cooling and in this latter case the quenched alloy is always harder than the annealed metal. The hardness of an alloy is detd. by the temp. at which the last transformation took place, the rate at which it took place, the max. temp. reached since it took place, and the shortness of the period during which it has been kept at this max. temp. Hardness from quenching is closely related to the fineness of the structure. Annealing is liquation within a solid and this liquation appears to be limited only by the complete isolation of the constituents. W. T. H.

The Electrical Conductivity and Constitution of Alloys. W. M. GUERTLER. *Engineering*, **92**, 544–7.—The results from the thermal analysis of alloys are somewhat unsatisfactory because it is impossible to prevent, for any length of time, the interchange of heat with the surrounding space. In thermal analysis it is hard to arrive at values which correspond to complete equil. Moreover, thermal analysis is of little help in studying reactions that can take place in the completely solid state. The study of the elec. cond. and spec. resistance, however, gives valuable information concerning slow changes and it distinguishes between homogeneous and heterogeneous systems much better than any other method. W. T. H.

The Aerial Oxidation (Rusting) of Metals. W. R. DUNSTAN AND J. R. HILL. *J. Chem. Soc.*, **99**, 1835–53; *Proc. Chem. Soc.*, **27**, 221.—Any theory that explains the formation of rust on Fe must also show how certain inhibiting agents prevent rusting. In the latter respect the CO_2 and electrolytic theories are weak. Expts. indicate that

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the rusting of Fe is similar in principle to the corrosion of other metals such as Cu. Fe rusts copiously in 0.007% $Ba(OH)_2$ soln. in which the conc. of H^+ is only 0.015% of what it is in pure H_2O. According to the electrolytic theory such a lowering of the H^+ conc. should tend to prevent rusting. An expt. in which Fe was kept under water in a flask which was connected by a narrow tube with another flask containing H_2O and dissolved O indicated that rusting takes place at the surface of the metal only and that $Fe(OH)_2$ is probably the primary product of the oxidation. In most cases H_2O_2 is formed when the metal oxidizes. The aerial oxidation of Cu resembles that of Fe and the electrolytic soln. pressure of Cu is much less than that of H so that in accordance with the electrolytic theory of rusting Cu should not oxidize when in contact with H_2O and dissolved O but it does. All inhibiting agents render the metal passive and it does not rust when in the passive state. W. T. H.

The Passivity of Iron and Certain other Metals. W. R. DUNSTAN AND J. R. HILL. *J. Chem. Soc.*, 99, 1853–67; *Proc. Chem. Soc.*, 27, 222.—The passivity of metals appears to be caused by the formation of a film of oxide upon the surface of the metal. Besides Fe, Ni and Co, the metals Zn, Cu and Mg can also assume the passive state. Salt solns., especially of the halides, often have a vivifying effect which is traced to an electrolytic action in which the acidic ion is liberated and attacks the film of oxide. W. T. H.

Electrolytic Corrosion of Iron by Direct Current. J. L. R. HAYDEN. *J. Frank. Inst.*, 172, 295–308.—Sheet Fe plates both as anodes and cathodes were immersed into various electrolytes and a const. current passed through the cell for periods of about 100 hrs. The extent of corrosion was detd. by loss in wt. The general conclusions are: (1) The extent of corrosion cannot be deduced from the amt. of current flowing because Fe may be in a passive state, in which electrolytic corrosion is absent, or in an active state, in which the extent of corrosion follows Faraday's law. (2) Sometimes under apparently identical conditions either the active or passive state may occur. (3) Alk. solns. and dichromates tend to cause passivity while sulfates and chlorides tend to destroy it. (4) High current d. tends to produce passivity. (5) Ferrous compds. result from corrosion of active Fe and ferric compds. from passive Fe and the passive state occurs in such electrolytes as prevent the existence of ferrous compds. (6) The p. d. at the electrodes is much higher in the passive state than in the active one. W. T. H.

Case Hardening of Steel by Carbon Monoxide and Carbon. F. GIOLITTI. *Met. Chem. Eng.*, 9, 598–602.—When the cyanides, ferrocyanides and other deriv. of CN are used alone as case-hardening agents, the hardening is too energetic and carburized zones are produced in which the conc. of C in the outer layer is high but when a certain depth is reached the conc. is suddenly lowered in successive layers. Such zones produce peeling and brittleness. G. prefers to use CO and solid C in conjunction with one another. The process may be carried out in the ordinary horizontal muffle but a specially designed furnace is described. Data concerning the results are given for a mild steel and for a Cr-Ni steel. Brittleness and peeling are obviated. W. T. H.

The Patinae of Bronze. F. MARGIVAL. *Rev. chim. ind.*, 22, 304–10.—The natural formation of metal coatings is described, methods for removing the patinae, and various ways in which they can be produced artificially. W. T. H.

The Alloys of Aluminium. A. GAUTHIER. *Rev. chim. ind.*, 22, 310–1. Nothing new. W. T. H.

Tests of Nickel-steel Riveted Joints. A. N. TALBOT AND H. E. MOORE. Univ. Eng. Expt. Sta. Univ. of Ill. *Bull.* 49.—The investigation included tests in tension and in alternate tension and compression, the bending of rivets, the deformation of

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the joints and the slip of the plates, the yield point of the joints and their ultimate strength. W. T. H.

Cerium-Tin Alloys. R. VOGEL. Inst. physik. Chem., Göttingen. *Z. anorg. Chem.*, **72**, 319–28.—Ce and Sn react together with considerable evolution of heat and form 3 compds. all of which m. at a temp. higher than the m. p. of Sn or Ce. They decompose H_2O with evolution of gas. Liquid Ce and Sn are miscible in all proportions but the compds. Ce_2Sn and $CeSn_2$ are very slightly sol. in pure Ce or Sn at low temps. Ce_2Sn m. 1135°, Ce_2Sn_3 1165°, and $CeSn_2$ 1400°. All the alloys with less than 80% Sn are pyrophoric especially when they contain Ce_2Sn (0–50% Sn). The max. hardness (6 on the Moss scale) is obtained in the alloy with 30% Sn and this is the most pyrophoric alloy. Corresponding to the pyrophoric nature, the alloys rich in Ce are not very stable in the air and the compd. Ce_2Sn is least stable. With less than 30% Sn, the decomp. product is colored yellow with CeO_2 but as the Sn is increased up to the compd. Ce_2Sn, the powder formed is black but, on being heated, it glows, gives off a peculiar odor and becomes gray. This peculiar odor was noted when the alloys reacted with H_2O. W. T. H.

The Ternary System, Copper, Silver, Gold. ERNST JÄNECKE. Hannover. Tech. Hochschule. *Metallurgie*, **8**, 597–606.—Using an elec. furnace made of magnesite brick and a specially constructed chronograph, the binary system Au-Ag and the ternary system Cu-Au-Ag were carefully investigated thermally and microscopically. The Au-Ag diagram showed some differences from that obtained by Rose and Roberts-Austen. The ternary system showed the features which could have been theoretically predicted. CARL R. HAYWARD.

The Rusting of Cast and Drawn Tubes. H. WÖLBING. Berlin. Kgl. Bergakademie. *Metallurgie*, **8**, 613–7.—The results obtained by W. differ widely from those of Arndt (*C. A.*, **4**, 3058; **5**, 273). The difficulties in getting an accurate method for detg. the rate of rusting are discussed. The rapidity of rusting of cast Fe, steel and wrought Fe tubes is in the order named but the rusting of cast Fe takes place more evenly over the surface while the other 2 rust in spots. The tendency therefore is for holes to appear in steel and wrought Fe tubes before they do in cast Fe. CARL R. HAYWARD.

Investigations of the Mechanical and Chemical Properties of Aluminium-Cobalt Alloys of Low Specific Gravity. H. SCHIRMEISTER. *Metallurgie*, **8**, 650–5.—S. studied the properties of Al-Co alloys pure, and with the addition of small quantities of W and Mo, with the following results: Of the binary alloys, that with 9–12% Co possessed the best mechanical properties although the tensil strength scarcely exceeded that of pure Al. The fracture was coarsely cryst. The addition of small quantities of W raised the tensil strength and made the fracture finer but large quantities of W were injurious. The best results were obtained with 0.8–1.2% W which gave cast test-pieces having 2–3 times the strength of Al cast under the same conditions. The hardness is proportional to the amt. of Co in the alloy. The alloys are easy to work, take a good polish and resist the action of the air. Their d. is 2.8–2.9. The replacement of W by Mo had no important advantages. What has been said of the former is true of the latter. It was found necessary to use crucibles free from C and S as these substances make the alloys worthless. CARL R. HAYWARD.

Metallography of the System, Selenium-Antimony. H. PELABON. *Compt. rend.*, **153**, 343–6.—The only pure compd. which it is possible to prepare by direct fusion of the elements was found to be Sb_2Se_3. Mixts. richer in Sb contained crystals of Sb_2Se_3 imbedded in a homogeneous mass of Sb. These mixts. may be divided into 3 groups. (1) When the Se content lies between 16 and 50 at. % the melt consists of 2 phases of slightly different d. The lighter is the eutectic itself and the heavier

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is richer in Sb and also contains some eutectic. (2) If the Se content is less than 16 at. % the melt consists of a single phase. The cool cold alloy contains eutectic but in decreasing amt. as the Se increases. (3) If the Se content lies between 50 and 60 at. %, the alloys contain the eutectic and large crystals of Sb_2Se_3. R. W. LEWIS.

Metallographical and Photochemical Studies of the System: Sulfur-Tellurium. MASUMI CHIKASHIGE. *Mem. Coll. Sci. Eng. Kyoto*, 3, 197–211.—The conventional method for the study of alloys shows that S and Te are each sol. in the other to about 2% in the solid state. The satd. solid solns. form an eutectic m. 109° containing 7% Te. Melted S in the β-form dissolves about 10% Te and in the γ-form about 20%. A transformation of β-crystals into the α-form occurs on exposure to light or at a very low temp. A photochem. study made by exposing the crystals to light transmitted through screens of various color shows that β-crystals with 0.5–2% Te are blue sensitive, the light causing a crystallographic change and markedly increasing their solubility in CS_2. A diagram and numerous photomicrographs are given.
R. S. WILLIAMS.

Alloys of Tellurium with Zinc. MATSUSUKE KOBAYASHI. Mem. Coll. Sci. *Eng. Kyoto Imp. Univ.*, 3, 217–20.—An equil. diagram and a series of photomicrographs show that Te and Zn form a compd., TeZn melting at 1238,5°, sol. in Te but only slightly sol. in Zn. R. S. WILLIAMS.

Corrosion of Iron in Concrete. 20.

LEDEBUR, A.: **Leitfaden für Eisenhütten-Laboratorien.** 9 Aufl. Braunschweig: F. Vieweg & Sohn, 8°, 5 M.

PROUST, G.: **Recherche pratique et exploitation des mines d'or.** Paris: 8°, 116 pp.

ROSENHAIN, W. AND ARCHBUTT, S. L.: **The Constitution of the Alloys of Aluminium and Zinc.** Dulau, 2s. 6d.

U. S., 1,004,115, Sept. 26. F. K. VIAL, Chicago, Ill. **Regulating the degree of surface chill of a casting** made from Fe, C and other ingredients such as Si and Ti in the molten state by adding Cr and pouring the comp. in a mold having a metal chiller, the proportion of Cr being about 0.2% and being greater the greater the size of the casting.

U. S., 1,004,187, Sept. 26. W. P. OGDEN, Denver, Colo. **Ore concentrator.**

U. S., 1,004,340, Sept. 26. DAVID BAKER, Philadelphia, Pa. **Furnace for desulfurizing and nodulizing fine ores,** comprizing 2 downwardly inclined hollow sections arranged end to end, mechanism for rotating the upper section at such speed that the ore will travel slowly toward its lower end, and for rotating the lower section at a higher speed to cause the desulfurized ore to pass through it rapidly, and connections for introducing the heating medium into the lower section, the ore being desulfurized in the upper section and nodulized by the greater heat in the lower section.

U. S., 1,004,412, Sept. 26. T. M. GILCHRIST, White Bird, Idaho. **Ore concentrator.**

U. S., 1,004,468, Sept. 26. I. H. REYNOLDS and F. E. NORTON, Youngstown, Ohio. **Extracting moisture from air for metallurgical purposes,** by compressing it, bringing it while compressed into contact with a surface, the temp. of which is lower than that of the air to cause the moisture to condense, permitting the dried air to expand and thereby lower its temp., and finally employing the cold air thus obtained

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to lower the temp. of the medium employed *e. g.*, H_2O, to cool the cooling surface, by bringing it into contact with the conduit through which it flows.

U. S., 1,004,676, Oct. 3. B. NEILLY, Bradford, Ontario, Canada. **Refining silver bullion** by m. it and adding to the fused metal Fe to form a speiss and suddenly cooling the metal to sep. the bullion from the speiss, then remelting the bullion and covering its surface with a flux of sand and borax, and finally subjecting the surface of the flux to a blast of air.

U. S., 1,004,815, Oct. 3. F. I. DU PONT, Wilmington, Del. **Gravity separation of solids in a liquid** volatilizable halide of a metal, *e. g.*, $SbCl_3$, conveying the sepd. ingredients from the liquid and subjecting them to a heat sufficient to volatilize the $SbCl_3$, etc. and adding to the liquid at the point of sepn. 1–2% of NH_4Cl to prevent loss of Sb by oxidation of the $SbCl_3$.

U. S., 1,004,916, Oct. 3. P. SCHMIEDER, Lipine, Ger. **Rotary furnace for roasting zinc ores, etc.,** comprizing a rotatable roasting cylinder having distributing channels lengthwise in its wall, feeding nozzles communicating with the channels and with the interior of the cylinder, the nozzles extending in a direction opposit to the direction of rotation of the cylinder so that the material within the latter will be prevented from entering the nozzles, and a supply for feeding air to those of the channels whose feeding nozzles are covered by the material.

U. S., 1,004,929, Oct. 3. G. J. STOCK, Darlington, England. **Apparatus for making steel,** comprizing a m. furnace, a converter, and economizer built in 2 sections for heating air by the products of combustion from the m. furnace and connections for using the heated air from one of the sections in the m. furnace and from the other in the converter.

U. S., 1,004,987, Oct. 3. E. A. BYRNES, Washington, D. C. **Cast ingot** containing 99.5–99.7% Fe, not over 0.15% total C, S, P, Mn, O and N, and at least 0.10–0.15% Si.

U. S., 1,005,022, Oct. 3. K. GOLDSCHMIDT and J. WEBER, Essen-on-the-Ruhr, Ger. **Detinning tin scrap** by placing laminated bundles of compressed tin scrap in a closed vessel with the laminas disposed substantially vertically, and circulating Cl gas through the bundles from the top toward the bottom of the vessel.

U. S., 1,005,091, Oct. 3. C. F. WILLIAMS, Erie, Pa., and W. DICKS, Dumbarton, Scotland. **Apparatus for making weldless or seamless metal tubes.**

U. S., 1,005,105, Oct. 3. C. F. DAVIS, Tallapoosa, Ga. **Amalgamator.**

U. S., 1,005,115, Oct. 3. F. HATLANEK, Kladno, Austria-Hungary. **Gun barrel or other similar article subject to repeated heating,** made of metal composed principally of steel alloyed with 4–5% of Cu.

U. S., 1,007,734, Nov. 7. W. S. ROCKEY and H. ELDRIDGE, New York, N. Y. **Making metallic manganese and calcium fluoride** by heating a mixt. of MnF_2 and Ca, the resulting Mn and CaF_2 sepg. from each other and the Mn being cooled beneath the CaF_2.

U. S., 1,007,990, Nov. 7. F. THARALDSEN, Trondhjem, Norway. **Reducing and smelting ores** by feeding a charge of ore into the top of a furnace, feeding in charges of reducing agent and ore to all sides of the first-mentioned charge below its point of entrance, at different levels in the shaft of the furnace, to control proportions of ore and reducing agent toward and within the m. zone, and supplying additional charges of reducing agent.

U. S., 1,008,044, Nov. 7. T. J. LOVETT, Chicago, Ill. **Amalgamating apparatus.**

U. S., 1,008,204, Nov. 7. A. SEGHERS, Paris, France. **Granulating slag** by

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maintaining it at a very high temp. in a closed receptacle by the combustion of gas under pressure and directing the burned gases at an angle against slag flowing from the receptacle.

U. S., 1,008,254, Nov. 7. MAX GLASS, Vienna, Austria-Hungary. **Briquetting cupriferous shavings, etc.**, by treating with a soln. of $(NH_4)_2CO_3$ to which CaO has been added in the presence of Cu oxide and pressing the treated material.

U. S., 1,008,261, Nov. 7. A. A. HARVIE, Ottumwa, Iowa. **Locally hardening thin steel articles**, *e. g.*, carpenters' squares, by dipping the portion to be hardened in a bath of melted KCN and leaving it submerged therein only long enough to become heated to the temp. of the bath.

U. S., 1,008,377, Nov. 14. A. SMITH, Tarentum, Pa. **Producing nearly pure iron** by treating crude Fe in a basic open-hearth furnace and substantially eliminating the contained Si, Mn, C, P and S, and introducing sticks of wood into the molten bath of Fe to agitate it, bring it into contact with the supernatant slag and deoxidize the metal.

U. S., 1,008,412, Nov. 14. L. S. HUGHES, Joplin, Mo. **Utilizing waste lead fume** by burning it to oxidize it, treating the oxidized fume with acid to dissolve the Pb oxide contained in it, sepg. the undissolved residue and recovering the Pb salt or salts from soln.

U. S., 1,008,420, Nov. 14. R. LOCK, Tarentum, Pa. **Eliminating slag from molten metal** by tapping it into a ladle, pouring the metal in a thin stream from this ladle into a second ladle to sep. it from the slag floating on it in the first ladle, and gradually and concurrently introducing a slag removing reagent, *e. g.*, hot CaO, into the second ladle.

U. S., 1,008,869, Nov. 14. W. S. SIMPSON, London, England. **Apparatus for distilling metals from ores, etc.**

U. S., 1,008,892, Nov. 14. T. EDWARDS, Ballarat, Victoria, Australia. **Ore-roasting furnace.**

U. S., 1,009,559, Nov. 21. S. PEACOCK, Chicago, Ill. **Furnace for treating sulfides, phosphides, etc., with gases,** comprizing a conveyer for feeding the material to be treated into the furnace body, a gas inlet, a conveyer for delivering the treated material from the furnace body, mechanism for rotating and regulating the inclination of the body, a resister of spiral form in the body to heat it and a H_2O-jacket around the furnace body.

U. S., 1,009,707, Nov. 21. P. H. DUDLEY, New York, N. Y. **In the manufacture of steel,** producing a bath of blown metal, recarburizing the bath, allowing the bath to rest for a time, pouring it into the teeming ladle, introducing Fe-Ti in the metal in the teeming ladle beneath the poured slag, the amt. of Fe-Ti being from 0.1–0.5% of 10% alloy or its equiv. to serve as a subsidiary deoxidizing agent.

U. S., Reissue 13,307, Nov. 7. J. H. ALLING, Columbia, Cal. Original Pat., No. 947,957 (*C. A.*, 4, 996). **Recovering gold** by mixing the finely comminuted ore with an aqueous soln. formed of $HgCl_2$ and KCN, causing the mixt. to flow successively in contact with Hg cathodes and passing elec. currents through the flowing mixt. to the cathodes to liberate nascent Cl and cause the reduction and amalgamation of the Au.

Brit., 2,963, Feb. 6, 1911. R. LUCKENBACH, Colwyn, Penna. **Concentrating amalgamator wherein** is provided a rotatable longitudinal shaft carrying a spiral member, 1 face of which is provided with pins and the other face with blades so curved and arranged as to form lifting scoops, means also being provided on the shaft and operating in unison with the spiral member to mechanically lift and discharge matter.

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Ger., 229,161, May 15, 1909. M. IMHOFF, Berlin and W. WELTI, Rürich-Dietlikon. **Burner for welding and cutting metals,** provided with a plate perforated around the O nozzle to prevent the penetration of the flame.

Ger., 229,409, May 8, 1910. FR. W. WINNER, Wiesbaden. Furnace for the utilization of the heat, under the vaulting, for melting metals, etc. The crucibles are suspended in openings of vault which can be closed by fireproof covers. Further details are specified.

Ger., 229,410, Feb. 26, 1909. ED. POHL, Rhöndorf a/Rh. **Rendering dense and equalizing cast blocks of steel, iron, copper,** etc., by rolling in a vertical position.

Ger., 229,671, Feb. 22, 1910. Addition to 207,627, FR. DALLEMAGNE and H. DALLEMAGNE, Passairs, Spain. **Moving apparatus for roasting furnaces,** in order to realize a rocking movement of variable degree and direction.

Ger., 229,672, June 27, 1909. MUREX MAGNITIU CO., London. **Preparation of ores and carboniferous rocks** by means of oily liquids according to the customary processes of sepn. The ore or rock is treated with an oily liquid such as animal, vegetable, or mineral oils, or creosote, fatty acids, or compds. of these substances which by reason of an addition of a metallic comp. contains a small % of an organic metallic combination insol. in H_2O and alkali, as oleate, resinate, etc. The oil becomes viscous and adheres more firmly and only to the metallic constituents. Oxides and carbonates cannot be washed out from the oily liquid so that the d. of the liquid is raised by oxides, and magnetic oxides can be used for magnetic sepn. Metallic compds. added to the oil, etc., are such as produce an insol. soap.

Ger., 229,733, June 2, 1909. R. RÖCHLING, Diedenhofen. **Air-blast heating** process with utilization of the waste heat for the warming of the air-blast. Only a part of the blast coming from the blowers passes through the blast-heater, while the other part is heated in a heat-exchanger by the waste gases of the blast heaters, then these heating blasts unite. By this process a const. blast-temp. can be realized through detd. regulation of the proportions in the mixt., and the heat of the waste gases is completely utilized.

Ger., 229,972, Nov. 28, 1909. L. ROUSSEAU, Argenteuil, France. **Metal fusing furnace with slide fuel shaft and an air conduit** passing through the furnace. The charge shaft terminates under the combustion chamber contg. the fuel below the crucible, and the air conduit is under the interposed part sepg. the combustion chamber and the crucible chamber. This partition has openings through which the air escapes.

Ger., 229,991, Jan. 28, 1908. H. BRANDENBURG, Kempen a/Rh. App. for **detinning waste tin** and other substances contg. Sn by alternating treatment with hot KOH lye and air; cf. *C. A.*, 5, 667.

Ger., 230,037, Nov. 20, 1908. Addition to 228,913. G. ULRICH, Magdeburg. **Magnetic ore treatment** in magnetic fields formed of single zones of increasing force in the direction of the feed channel of the ore or raw material. In order to be able to utilize the app. of 228,913, in the best possible manner, the upper surface of the pole shoes must always fit into the position of the surface on which the raw material is conveyed. In this addition the surface turned against the edges of the pole-shoes corresponding to the number of zones is arranged step-like. The pole-shoes are divided into layers corresponding to the number of zones which are displaced with respect to each other in order to form the steps.

Ger., 230,038, May 20, 1909. FR. FLOTHMANN, Marburg. **Round hearth for wet and magnetic preparation of ores.** Over the surface of the hearth moves a magnetic drum-separator by means of which the paramagnetic ores are removed from the hearth, and, by the rotation of the drum during the relative movement of the separator to the

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hearth, are out of range of the magnetic field and are passed through a gutter apart from the other ore.

Ger., 230,098, Sept. 26, 1909. S. EIMAN, Kolpino, St. Petersburg, Russia. App. for **cutting and welding metals** in curved lines by means of an oxyhydrogen, oxyacetylene, or like burner.

Ger., 230,493, June 18, 1909. J. GAILEY, New York. **Drying air for blast-furnaces.** Heretofore the heat lost has not been regained when the snow and ice began to thaw on the cooling coil of pipes. Instead of conducting this cold H_2O into outlet channels it is partly or wholly returned into the NH_3 condenser or otherwise utilized.

Ger., 230,706, Feb. 18, 1906. A. J. ARBUCKLE and A. OSBORNE, Blegravia n. Johannesburg (S. Africa). Conveyor-worm for **removing solid constituents from liquids,** especially auriferous liquids, in order to sep. stamped ores from the H_2O used for washing the same and from the cyanide soln. effecting the sepn. of the Au (cf. *C. A.*, 5, 2064).

10. ORGANIC CHEMISTRY.

J. BISHOP TINGLE.

Reaction of Aromatic Inner Anhydrides Depending on the Modification of the Crystallin Form of Iodoform. BRUNO BARDACH. Wien. *Z. anal. Chem.*, 50, 545–8; cf. *C. A.*, 3, 2688.—In a previous article the author showed that when I soln. acts on acetone in the presence of aromatic anhydrides and anhydride complexes, CHI_3 seps. which crysts. in needles instead of the hexagonal plates. To further investigate this reaction 2% alc. soln. of CHI_3 was added to sep. solns. of euxanthone and euxanthic acid containing traces of mineral salts such as are present in well water. In both cases CHI_3 crystd. in needles. Those substances whose reactivity is influenced by the crystal form of CHI_3 are divided into 2 groups: those which react directly in the presence of CHI_3 giving the needle form crystals, as euxanthone and euxanthic acid, and those which also give the needle form crystals when reacting in the presence of CHI_3 in *statu nascendi*. To the latter group belong phenolph., coumarin, and other anhydride-forming substances as aromatic oxyacids and polyoxy ketones. By applying these reactions the presence of aromatic inner anhydride, oxyacids, and polyoxy ketones can be detected. The reaction is of general interest because it shows a relation between the influence exerted by substances in soln. upon the cryst. form and their chem. constitution. D. BREESE JONES.

Configuration of the Benzene Nucleus. W. VAUBEL. Darmstadt. *Z. angew. Chem.*, 24, 1759–60.—Polemical against J. Lifschitz; see *C. A.*, 5, 3044. D. B. J.

Old and New Benzene Formulas. J. LIFSCHITZ. Leipzig. *Z. angew. Chem.*, 24, 1760.—A reply to W. Vaubel; see preceding abstr. D. B. J.

Syntheses of Hydrastinine and Cotarnine. H. DECKER. Hannover. *Z. angew. Chem.*, 24, 1890–2; *Chem. Ztg.*, 35, 1076–7.—An address. D. B. J.

Action of Alkyl Iodides on Cupric Oxide. HENRY G. DENHAM. New Zealand, Canterbury College, Christchurch. *Z. anorg. Chem.*, 71, 303–4.—With the view of preparing solid CuI_2, dry MeI vapor was passed over CuO at 310°. The chief product of the reaction was CuI. Other products formed were a substance which gave a strong aldehyde reaction, and a mixt. of gases consisting of O, CO, C_2H_4, CH_4 and its homologs. The first 3 gases were present to an extent of 3%, while those of the CH_4 series constituted a considerable part of the total gas vol. When EtI was used instead of MeI the C_2H_4 content rose to 50%, while the amt. of the paraffin hydrocarbons decreased correspondingly. D. BREESE JONES.

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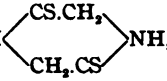
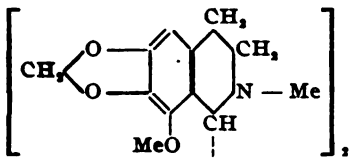
Action of Acetic Anhydride on Uranium Nitrate. L. VANINO. *Chem. Ztg.*, 35, 1005–6.—$UO_2(NO_3)_2$ reacts with Ac_2O with evolution of NO_2. The course of the reaction varies with the amt. of Ac_2O used. A yellow liquid is formed when a small amt. is used, while *anhydrous uranium acetate*, $UO_2(AcO)_2$, seps. as a yellow cryst. powder, when 20 cc. of Ac_2O is added to 25 g. of $UO_2(NO_3)_2$. The reaction depends on the presence of AcOH as an impurity in the Ac_2O which liberates HNO_3. Small amts. of other acids, as HCl, present, produce the same results. Other nitrates as $Pb(NO_3)_2$, $Th(NO_3)_4$, and $Tl(NO_3)_3$ react but slowly. D. BREESE JONES.

Thioamides: The Formation of Thiopolypeptide Derivatives by the Action of Hydrogen Sulfide on Aminoacetonitrile. TREAT B. JOHNSON AND GERALD BURNHAM. Sheffield Lab., Yale Univ. *J. Biol. Chem.*, 9, 449–62.—When H_2S was passed for 4 hrs. into a cold alc. soln. of 20 g. of aminoacetonitrile sulfate which had been satd. with NH_3 at 0°, 3.5 g. of *dithiopiperazine* sepd.;  , (glycocollthioamide is first formed, but being extremely unstable forms dithiopiperazine by an inner condensation, and by spontaneous decomp. yields thioglycylglycinethioamide. All attempts to isolate the glycocollthioamide failed) light brown, sandy powder. It can be pptd. unaltered from a soln. of its Na salt with HCl or H_2SO_4 as a light gray powder. It turns brown at 160°, and blackens at 270–280°; does not effervesce below 300°. It is purified by dissolving in cold alkali and pptg. with acids. When digested with NaOH soln. it decomposes giving Na_2S and $H_2NCH_2CO_2Na$. *Pb* and *Hg salts* stable, *Ag salt* unstable. The filtrate from the dithiopiperazine yielded 2 g. of *thioglycylglycinethioamide*, $NH_2CH_2CSNHCH_2CSNH_2$; dark brown powder; m. 89–95° (H_2S evolution). When warmed with H_2O it decomp. yielding H_2S. It has both basic and acid properties, and gives on hydrolysis with HCl glycocoll hydrochloride, H_2S, and NH_3. D. BREESE JONES.

Isomeric Bihydrocotarnines. M. FREUND AND O. KUPFER. Chem. Inst., Frankfort Acad. *Ann.*, 384, 1–38.—Bihydrocotarnine, (I), is prepared from cotarnine



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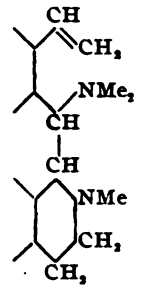

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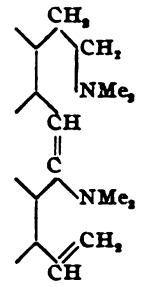

(III)

hydrochloride and ethylene bromide by the Grignard reaction. An isomeric *isocompound* is sepd. through its less solubility in abs. alc. The m. p. of each isomer is 163–4° but of a mixture, 139–42°. Hydrobromide, $C_{24}H_{28}O_6N_2.2HBr$, decomp. 228–9°, rhombs from H_2O or alc. *Iso salt*, identical with the previous. M. p. of mixture lowered 20°. Hydroiodides, cryst. in needles with 2HBr, m. 228–30°. *Hydrochlorides*, rhombic tables from alc., m. 231–2°. *Hydrofluorides*, felted needles, m. p. 227–9°. *Nitrates*, octahedra, m. 169–70°. The iso-base is transformed into the normal at 160°. Both bases are oxidized by $K_2Cr_2O_7 + H_2SO_4$ to cotarnine. Attempts to resolve the bases into optically active modifications were unsuccessful. *m*-Methiodide, $C_{24}H_{28}O_6N_2 \cdot CH_3I$, m. 233°, identical with that of Freund and Reitz. *Isocompound*, m. 233°.

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M. p. of mixture, 214–6°. Treatment of the iodide with AgOH gives the *hydroxide*, $C_{28}H_{28}O_6N_2.CH_3OH.10H_2O$, leaves m. 75–80°. Without isolating the same it may be converted through b. with KOH into *des-N-methylbihydrocotarnine*, (II), fine needles from ligroin, m. 120–2°. *Hydriodide*, $C_{28}H_{30}O_6N_2.2HI$, needles from alc., m. 173–5°. *Methyliodide* of the hydroxide, rhombic tables from H_2O, m. 215–6°. *Bihydrocotarnine dimethyliodide*, cubical crystals from alc., m. 210–2°. This compound by loss of I through AgOH and further treatment with KOH gives *di-des-N-methylbihydrocotarnine*, $C_{26}H_{32}O_6N_2$, needles from alc., m. 118–20°. *Methyliodide*, tables from alc., m. 113–5°. Treatment with EtONa gives *cotarnylidene-des-N-methylhydrocotarnine*, $C_{24}H_{25}O_5N$, cryst. m. 68–71°. The action of Br upon *des-N*-methylbihydrocotarnine gives a *dibromo compd.*, $C_{28}H_{30}O_6N_2Br_2$, fine needles, m. 164–6°. The base, m. at 120–2°, gives a *methyliodide*, cryst., m. 151°, which yields with EtONa *cotarnylidenehydrocotarnine*, $C_{29}H_{28}O_6N$, cryst., m. 100–2°, decomp. It is oxidized by $K_2Cr_2O_7$ + H_2SO_4 to contarnine. *Methyliodide*, m. 115–7°. *Hydroiodide* of the latter, plate-like crystals, m. 209–11°. *Cotarnyl-des-N-methylhydroxycotarnine*, $C_{22}H_{23}O_6N.CH_3OH$, cryst., m. 73–5°. *Methyliodide* of the latter, m. 169–2°. *Des-N-methylisobihydrocotarnine*, $C_{28}H_{30}O_6N_2$, rhombic columns, m. 136°. *Hydriodide*, needles, 146–9°. *Methyliodide*, cubical crystals, m. 159–62°. *Di-des-N-methylisobihydrocotarine*, (III), column-like crystals, m. 218–20°. *Methyliodide, m.* 156–8°. ALVIN S. WHEELER.

Ketenes. V. Reactivity of Carbonyl. H. STAUDINGER AND N. KON. Chem. Inst., Tech. Hochschule, Karlsruhe. *Ann.*, **384**, 38–135.—Diphenylketene or its quinoline deriv. which is convenient to weigh and which behaves like a free ketene above its m. p., 121–2°, was heated at 131° with each of the CO compds. mentioned below with either 0.5 mol. quinoline-ketene (= 1 mol. ketene) or 5 mol. quinoline-ketene. The CO_2 evolved was detd. by absorption in $Ba(OH)_2$, and in some cases the other product was isolated. The mixture was heated usually for 3 hrs. The figures below refer to the % of the calc. quantity of CO_2 set free. In many cases the free ketene was heated with the CO compd. in a bomb tube. HCHO, 14.0. Gave tetraphenyldiketocyclobutane and an amorphous unknown compd. AcH, same products and an oil. Enanthol, 2.0. Chloral, 8.8 and trichloromethyldiphenylethylene. Phorone, 11.8. Dimethyl ketopentadienedicarboxylate, 40.4. Dimethylcarbonic ester, 0.37. Tetramethylurea, 4.45. BzH, 9.3. Gave *triphenylethylene*, $PhCH : CPh_2$, cryst. m. 72°. *p*-Toluylaldehyde, 9.2. *p*-Chlorobenzaldehyde, 10.1. *o*-Methoxybenzaldehyde, 43.7. *m*-Methoxybenzaldehyde, 8.9 and 9.5. *p*-Methoxybenzaldehyde, 31.3. Gave *p-methoxytriphenylethylene*, $MeOC_6H_4CH = CPh_2$, cryst., m. p. 81–2°. Acetate of *p*-hydroxybenzaldehyde, 14.3. *p*-Dimethylaminobenzaldehyde, 56.4, but with 10 mol. ketone, 100.1; and 10 mol. aldehyde with 1 mol. ketene, 74.6. Product, *p-dimethylaminotriphenylethylene*, $Me_2NC_6H_4CH = CPh_2$, yellow to pale yellowish green cryst., m. 126–7°. Benzophenone, 8.7. Gave tetraphenylethylene. Methyl benzophenone, 4.6. Gave *p-tetraphenylethylene*, $Ph(MeC_6H_4)C = CPh_2$, cryst. m. p. 153°. Dimethylbenzophenone, 7.3. *p*-Chlorobenzophenone, 5.7. *p,p*-Dichlorobenzophenone, 9.6. *p*-Phenylbenzophenone, 5.3. Methyl *p*-benzophenonecarboxylate, 4.6. Dimethyl benzophenonedicarboxylates, 9.9. *m*-Nitrobenzophenone, 37.7. *o*-Methoxybenzophenone, 16.9. *m*-Methoxybenzophenone, 7.4. *p*-Compd., 14.4–17.2. *p,p*-Dimethoxybenzophenones, 14.9. Gave *p,p-dimethoxytetraphenylethylenes*, $C_{28}H_{24}O_2$, needles, m. 159–60°. *o*-Dimethylaminobenzophenone could not be prepared though various methods were tried. *m*-Compd., 14.0. *p*-Compd., 50.1. Gave *p-dimethylaminotetraphenylethylene*, $C_{28}H_{25}N$, cryst., m. p. 173°. *p-Benzoylmethylaminobenzophenone*, 7.7. Prepared from dimethylaminobenzophenone and BzCl, cryst., m. 105.5°. Michler's ketone, 64. Gave *tetramethyldiaminotetraphenylethylene*, $C_{30}H_{24}N_2$, yellowish green cryst., m. 211–2°. Acetophenone, 3.6; with 10 mol. ketene, 5.2. Product a third

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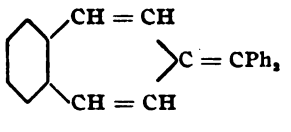
but *unknown polymer* of diphenyl ketone, cryst., m. 188°. *p*-Methoxyacetophenone, 6.7. *p*-Dimethylaminoacetophenone, described by Klingel, (*Ber.*, 18, 2694) is in reality a monomethyl compd. The *di-derivative* is prepared by b. 50 g. dimethylaniline with 70 g. Ac_2O and 89 g. $ZnCl_2$. The crude product b_{12} 108–10°. White cryst., from ligroin, m. 105.5°. CO_2 = 15.3. Trichloroacetophenone, 14.7. Desoxybenzoin, 0.9. 1,1-Dichlorodesoxybenzoin, 3.9. Benzoinmethyl ether, 1.9. Ethyl benzoylacetate, 2.5. Benzoylacetone, 1.4. Methyl benzoate, 0.4. Dimethylbenzamide, 6.0. Diphenylbenzamide, 3.8. Benzoyl chloride, 0.2. Benzoyl cyanide, 6.3. Gave triphenylacrylic nitrile, m. 162-3°. Methyl anisate, 1.8. *Dimethyl anisamide*, (5.8), was prepared according to the Schotten-Baumann reaction. Colorless cryst., m. 42°, from CS_2 + ligroin. Anisyl chloride, 0.2. Methyl diaminobenzoate, 5. *3-Dimethylaminobenzdimethylamide*, (14.7), was prepared from dimethylaminobenzoyl chloride and dimethylamine in C_6H_6. Pale yellow scales, m. 94–5°. Dimethylaminobenzoyl chloride, 2.5. Methyl cinnamate, 2.7. *Cinnamyl dimethylamide*, (13.3), $C_{11}H_{13}ON$, from $Me_2NH.HCl$, long needles, m. p. 103°. Cinnamyl diphenylamide, 8.4. Cinnamyl chloride, 8.4. Cinnamic nitrile, 57.0. Dibenzalacetone, 71.0. *p*-Dichlorodibenzalacetone, 65.2. Dianisalacetone, 56.7. Tetramethyldiaminodibenzalacetone, 39.2. Gave γ-diphenylmethylene-α,ε-tetramethyldiaminodiphenylpentadiene, $C_{34}H_{34}N_2$, yellowish brown cryst., m. p. 169–70°. Benzalacetophenone, 36.8. Methoxybenzalacetophenone, 31.6. Dimethylaminobenzalacetophenone, 22.4. Benzalmethoxyacetophenone, 37.6. *Benzaldimethylaminoacetophenone*, (55.0), $C_{17}H_{17}ON$, from dimethylaminoacetophenone and BzH. Yellow needles, m. p. 166°. *Ethylideneacetophenone*, (18.9), PhCOCH = CHMe, is prepared by distillation of 2-benzoylisopropyl alcohol with $ZnCl_2$ as catalyzer. Pale yellow oil of piercing odor, b_{11} 114–5°. *2-Benzoylisopropyl alcohol*, $PhCOCH_2CH(OH)Me$, was prepared by the action of AcH on acetophenone in MeOH with 2 drops 50% KOH. Colorless oil, b_{12} 150–2°. Trichloroethylideneacetophenone, 17.4. Methoxybenzoylphenylacetylene, 30.1. Cinnamic aldehyde, 50.7. Benzalacetone, 19.3. Dimethylaminobenzalacetone, 16.7. Benzocycloheptadienone, 89.4. Gave *benzhydrylidene-benzocycloheptadiene*, (I), yellow



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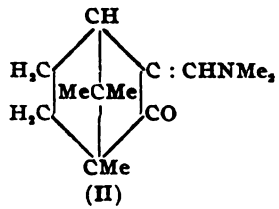

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cryst., m. p. 92°. Dimethylbenzocycloheptadienone, 66.2. Gave *benzhydrylidene-dimethylbenzocycloheptadiene*, $C_{20}H_{22}$, cryst., m. 128.5–9°. Diphenylbenzocycloheptadienone, 14.8. Gave *benzhydrylidene-diphenylbenzocycloheptadiene*, $C_{30}H_{26}$, white cubes, m. 181–2°, from Me_2CO. Pyrone, 43.2. Gave *γ-benzhydrylidenepentamethylene oxide*, $C_{19}H_{14}O$, yellow cryst., m. 86°. Dimethylpyrone, 6.6. Xanthone, 10.7. Camphor, 0.5. *Dimethylaminomethylenecamphor*, (II), (10.4) was prepared by the action of dimethylamine on oxymethylenecamphor in MeOH. White scales, m. 63–4°. Methoxymethylenecamphor, 1.7. Chloromethylenecamphor, 1.1. Benzylidenecamphor, 0.2. Fluorenone, 46.1. Gave diphenyldiphenylenethylene. Dibenzylketone, 1.1. Anthraquinone, 0.7. 1-Dimethylaminoanthraquinone, 2.8. Some 40 pages are devoted to a discussion of the results. ALVIN S. WHEELER.

Dimethylaniline and its Derivatives. J. WALTER. *Z. Farb. Ind.*, 9, 379–82, 17–20, 49–51, 65–8; through *Chem. Zentr.*, 1911, I, 726, 879, 1411; cf. *C. A.*, 6, 156. —I. Solubility of dimethylaniline at 12° in H_2O is 1–1.44%; flash pt., 75°. By con-

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densation of dimethyl aniline with cinnamic aldehyde through $ZnCl_2$ and oxidation with chloroanil in hot alc. soln., a green dye similar to malachite green is obtained. Dimethylaniline and β-naphthylaldehyde give yellow-green. β-Naphthol-α-aldehyde gives violet. Malachite green sulfonic acid from *m*-sulfobenzaldehyde can be distinguished from Helvetia green, obtained by sulfonation of the leucobase of malachite green and subsequent oxidation by b. it with aniline, toluidine or xylidine which gives a blue dye, the formation of which takes place by splitting off sulfo-group and partial reduction. Malachite green leucobase is altered by b. with slacked lime. By heating sucrose with dimethylaniline and HCl on water bath the mixture turns green, violet-blue, and finally gray-blue; in b. water and HCl it is fully sol. with a fuschsin-red color. Apparently there is a condensation between glucose and dimethylaniline; with levulose there is probably no reaction. Similar reactions are obtained with diphenylamine, etc. With azoxybenzaldehyde disulfonic acid (obtained from azoxystibenedisulfonic acid by oxidation) and dimethylaniline and subsequent oxidation a green dye is obtained; also the bright yellow dye (first to dye cotton directly) directly obtained with NaOH, co[illegible]es with dimethylaniline-HCl, and by oxidation the leucobase of a green dye is [illegible]ned. Wood is colored green by heating with dimethylaniline and HCl; the colo[illegible]es not change with cold HCl, water, or drying. NaOH decolorizes, but HCl restores color. II. *Tetramethyldiaminodiphenylmethane* is obtained by heating for 2 days equal parts of dimethylaniline and $ZnCl_2$ to 200–220°; as side reactions lower methyl derivs. also *p,p*-derivs., violet bases and leuco-bases are formed. It can be obtained also by long heating with HCl to 120°, or with benzoic acid, but only in presence of O. By allowing dimethylaniline to stand with Ac_2O in the air for a long time, tetramethyldiphenylmethane and *dimethylaniline oxide* are produced, isolated as picrate, not decomposed by NH_3. *Dimethylanilinepicrate*, yellow m. 157–8°, decomp. 168°, decomp. by NH_3. *Ammonium picrate* browns at 258°, explodes at higher temp. Dimethylaniline with O of air produces a labil product dimethylaniline oxide; in presence of water the latter is not formed. III. Dyes from condensation of aromatic amino and nitro compds. The dyes which nitro, esp. polynitro, compds. form with amines and hydrocarbons, are useful for the isolation and purification of certain compds. W. then describes the following yellow to orange-red dyes, all being compds. of dimethylaniline and picric acid: Styphninic acid, nitronaphthalene, nitrobenzene, *o*- and *p*-nitrotoluene, *m*-dinitrotoluene, *m*-dinitrobenzene, dinitro-α-naphthol. Dimethylaniline and trinitrotoluene give a dark brown soln. Many compds. were isolated in this way in aqueous soln. without extn. with ether. Compds., of the following bases with trinitrotoluene were described. Aniline, *o*- and *p*-toluidine, monoethyl- and ethylbenzylaniline, dimethyl-α-naphthylamine, diethylaniline, amylaniline, dimethyl- and diethyl-*p*-toluidine, dimethyl-*o*-toluidine, phenylhydrazine, nitrosodimethylaniline, diphenylamine, quinoline, tetramethyldiaminodiphenylmethane, auramine base, tetramethyldiaminobenzophenone, diaminotriphenylmethane, tetramethyldiaminotriphenylmethane, *m*-nitrotetramethyldiaminotriphenylmethane and carbinol of this base, fuchsin base, hexamethyltriaminotriphenylmethane, trimethyltriphenyltriphenylmethane, α- and β-naphthylamine, anthranilic acid and its methyl ester, *p*-aminobenzoic acid, dimethyl-*p*-aminobenzoic acid (its amide and ester), *o*-tolylglycine, Et anilinoacetate, phenylaminoacetonitrile, diethyl-*m*-aminophenol, *m*-aminophenol, tetramethyldiamino-*m*-phenylenediamine. No dyes were obtained with acridine, indolecarbonic acid, phthalimide, benzamide, acetamide, acetanilide, urea, bisphenylmethylpyrazolone, phenylmethylpyrazolone, antipyrine. Dimethylaniline or dimethyl- or diethyl-*p*-toluidine are esp. suitable for detn. of trinitrotoluene in explosives. The strongest color was obtained with tetramethyldiamino-*m*-phenylendiamine.

SIDNEY BORN.

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Homocholine and Neosine. E. BERLIN. Charn. Abt. physiol. Inst., Marburg. *Z. Biol.*, 57, 1–74.—γ-Homocholine was synthesized (1) from NMe_3 and trimethylene-chlorohydrin and (2) from aminopropyl alc. and MeI. Oxidation with $KMnO_4$ gave β-homobetaine. By the 2nd method of prep. some of the isomeric β-homocholine was obtained and identified by oxidation to betaine. γ-Homocholine aurate, m. 193–4°. *β-Homocholine aurate* at 163–4°. Neosine from crab exts. is closely similar to γ-homocholine but judging by the Au salt, is not identical. γ-Homocholine lowers blood pressure more than choline. A. F. BLOOD.

Synthesis of δ-Guanidinovaleric Acid. D. ACKERMAN, R. ENGELAND AND FR. KUTSCHER. Physiol. Inst., Würzburg and Marburg. *Z. Biol.*, 57, 179–82.—δ-Guanidinovaleric acid m. 265–6° (decomp.) was synthesized from aminovaleric acid and cyanamide. *Anhydride*, m. 170–1°, and *aurate* m. 120–2°. A. F. BLOOD.

Labil Isomerides of the Same Structure which can be Converted One into Another. EMIL ERLENMEYER. Kaiserl. Biol. Anstalt, Dahlem. *Biochem. Z.*, 34, 306–53.—Isocinnamic acid as described by Erlenmeyer, Sen., exists and possesses the properties originally assigned to it. It can be changed into the allo acid. The allo acid on treatment with small quantities of alc. $ZnBr_2$ soln. is converted into the Erlenmeyer iso acid which is also converted into the allo form when left in contact with H_2SO_4. The Lieberman iso acid prepared from natural sources also exists. It changes spontaneously into the allo acid which is an actual modification and not a component of the iso acid. The L. iso acid can be prepared artificially from the brucine salt of the allo acid and also by reduction of α-bromoallo acid. When the allo acid is neutralized with brucine, 2 salts can be sepd. by fractional crystn. which differ in several physical properties; 1 of these yields the iso acid in the hemihedral the other in the holohedral form. G. M. MEYER.

Action of Piperidine on the Chloro-oxime of *d*-Pinene. L. B. BUSHUEV. *J. Russ. Phys. Chem. Soc.*, 42, 1447–8.—Contrary to the statement in Schimmel & Co.'s report, Oct., 1910, the formation of nitrosopinene in the above reaction was first observed by the author (*C. A.*, 5, 1096), but was entirely unnoticed by Wallach (*Ann.*, 245, 252). H. M. GORDIN.

Synthesis of α-Ethyl-β-hydroxybutyric Acid. I. MATZUREVICH. Org. Lab., Univ. St. Vladimir. *J. Russ. Phys. Chem. Soc.*, 42, 1576–82.—The *ethyl α-ethyl-β-hydroxybutyrate*, $C_8H_{16}O_3$, was obtained (not abs. pure) by the action of Zn on EtCHBr-CO_2Et + AcH; liq. of agreeable odor; b_{15} 102–5°; d_4^{30} 0.97366; n^{30} 1.42694. NaOH or $Ba(OH)_2$ saponify it to the acid. *Na salt*, $C_6H_{11}O_3Na$. *Ba salt*, $(C_6H_{11}O_3)_2Ba$. *Ag salt*, $C_6H_{11}O_3Ag$. *Cu salt*, blue powder. When distilled 3 times the acid loses H_2O, changing to α-ethylcrotonic acid. H. M. GORDIN.

Action of Magnesium and Halogen Derivatives of the Aliphatic Series on Ethyl Chlorocarbonate. I. MATZUREVICH. Org. Lab., Univ. St. Vladimir. *J. Russ. Phys. Chem. Soc.*, 42, 1582–9.—Et_3COH was obtained by the action of Mg + EtI or EtBr on $ClCO_2Et$. *Intermediate products*, $C_7H_{15}OMgBr$ and $C_7H_{15}OMgI$ resp., having similar properties; both are cryst., falling to powder on exposure to the air; lose 47% at 94–5°. On further drying they began to gain wt. Pr_3COH was obtained from Mg + PrBr and $ClCO_2Et$. H. M. GORDIN.

Oxide of Biprimary Decamethylene Glycol. I. V. EGOROV. Techn. Lab., Univ. St. Vladimir. *J. Russ. Phys. Chem. Soc.*, 42, 1655–65.—In attempts to prepare a hydroxy acid from sebacic acid a considerable amt. of *biprimary decamethylene glycol*, $HO(CH_2)_{10}OH$ (I), was obtained; m. 71–1.5°; yields by oxidation with HNO_3 (1.4) sebacic acid and some $(CO_2H)_2$; is changed by HBr into a *dibromide*, $Br(CH_2)_{10}Br$; m. 27°. On treating the dibromide with KOH in alc. a *diethyl ether*, $EtO(CH_2)_{10}OEt$,

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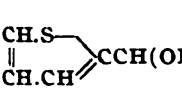
was obtained; b. 257–60°; d_0^0 0.85. On warming (I) with H_2SO_4 (47%) *decamethylene oxide*, $CH_3(CH_2)_3CH<\begin{matrix}CH_2CH_2\\ |\\ O—CH_2\end{matrix}$, was obtained, b. 197–9°; d_0^0 0.8694; oxidation with HNO_3 gives a small amt. of $(CO_2H)_2$; with N_2O_4 succinic and hexylic acids are produced; treated with PCl_5 HCl is evolved and an unsat. (adds Br) oil is formed; with PBr_5 *a compd.*, $CH_2Br(CH_2)_2CHBr(CH_2)_5CH_3$(?), is obtained. Attempts to prepare the unsat. $CH_2 : CH(CH_2)_6CH : CH_2$ were not successful. H. M. Gordin.

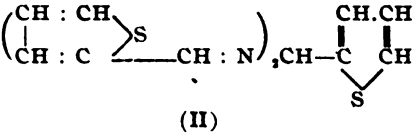
Action of Isoamyl Nitrite on Amines and Amides. S. Smirnov. *J. Russ. Phys. Chem. Soc.*, 43, 1–17.—Warmed with dry freshly distilled NO_2Am(iso), $AcNH_2$ yields (iso)AmOH, AcOH, AcOAm(iso), N and H_2O; $CO(NH_2)_2$ yields N, CO_2, H_2O, (iso)AmOH and H_2NCO_2Am(iso); H_2NAm(iso) yields N, (iso)AmOH and a considerable amt. of an undetd. oil; dibenzylamine yields (iso)AmOH and nitrosodibenzylamine; Ph_2NH yields (iso)AmOH and nitrosodiphenylamine. Am = amyl. H. M. G.

Action of Thienyl Magnesium Iodide on Allyl Bromide. E. Grishkevich-Trokhimovskii. Org. Lab., Women's High School, Kiev. *J. Russ. Phys. Chem. Soc.*, 43, 201–3.—*α-Allylthiophene*, C_7H_8S, was made by the action of Mg and α-iodothiophene on allyl bromide; colorless mobil liquid of a strong disagreeable odor; b_{732} 158.5–9°; $d_4^{20.5}$ 1.0175; $n_D^{20.5}$ 1.52813; absorbs Br; combines with liquid NO_2 to a dark cryst. compd.; its soln. in AcOH gives with phenanthraquinone in H_2SO_4 a reddish brown color, and with isatin in H_2SO_4 a cinnamon-red color; is oxidized by $KMnO_4$ to α-thiophenecarboxylic acid, reacts with fuming HNO_3 with explosion. H. M. G.

Preparation of α-Thiophenealdehyde and its Derivatives. E. Grishkevich-Trokhimovskii. Org. Lab., Women's High School, Kiev. *J. Russ. Phys. Chem. Soc.*, 43, 204–7.—Thiophenealacetal (I) was made by the action of Mg and Et orthoformate on α-iodothiophene; colorless mobil liquid of an agreeable fruity odor; b_{743} 222.5–3.5°; d_4^{17} 1.0571; n_D^{17} 1.4902; yields upon sapon. with hot dil. HCl in a current of CO_2, α-thiophenealdehyde. By the action of NH_3 in alc. this is changed to the *α-thiophenealdehyde hydramide* (II); rosets, m. 111.5°; even weak acids decomp. it.



(I)



(II)

H. M. Gordin.

Action of Magnesium on a Mixture of Allyl Bromide and Piperonaldehyde. N. D. Koryukin. Org. Lab., Univ. St. Vladimir. *J. Russ. Phys. Chem. Soc.*, 43, 208–11.—*3,4-Methylenedioxybenzene-1-butenol*, $H_2C : CHCH_2(OH)CHC_6H_3 : O_2CH_2$, was made by the action of Mg and allyl bromide on piperonal; colorless viscous liquid of agreeable odor; becomes yellow in the air; $b_{23.5}$ 166–7°; $d_4^{23.6}$ 1.2016; $n_D^{23.6}$ 1.55489; is oxidized by $KMnO_4$ to piperonylic acid. H. M. Gordin.

Action of Magnesium on a Mixture of Allyl Bromide and Benzaldehyde. Synthesis of Allylphenylcarbinol. D. Klimenko. Org. Lab., Univ. St. Vladimir. *J. Russ. Phys. Chem. Soc.*, 43, 212–3.—In this reaction *allylphenylcarbinol* is obtained; colorless mobil liquid of a BzH odor; b_{24} 126–7°; $d_4^{25.6}$ 1.0161; $n_D^{25.6}$ 1.53251; is oxidized by $KMnO_4$ to BzOH, a sirupy liquid (glycerol ?) and a substance m. 50°. H. M. G.

Action of *o*- and *p*-Magnesium Bromotoluene on the Symmetrical Dibromomethyl Ether. Preparation and Properties of Xylyl Ethers. N. Pavlovskii. Org. Lab., Univ. St. Vladimir. *J. Russ. Phys. Chem. Soc.*, 43, 214–8.—*p-Xylyl ether*, $(MeC_6H_4CH_2)_2O$, was obtained by the action of Mg and *p*-toluene on $BrCH_2OCH_2Br$;

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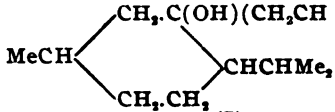
colorless, cryst., m. 61–2°; b. 310–1°; gives with HBr *p-xylyl bromide* (m. 35°; b. 216–24°), and with HI *p-xylyl iodide* (m. 45.0–6.5°). *o-Xylyl ether* prepared by similar method from *o*-bromotoluene; colorless oil, b_{26} 201–3; $d_4^{19.8}$ 1.02189; $n_D^{19.8}$ 1.55784; gives with HBr or HI *o-xylyl bromide* (b. 215-20°) and *o-xylyl iodide* (m. 34°) resp. H. M. Gordin.

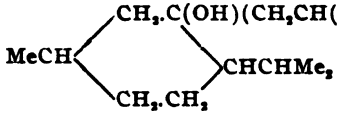
Principal Properties of Oxonium Dibromides of Simple Ethers. V. V. Chelintzev. Lab. Nicolai Saratov Univ. *J. Russ. Phys. Chem. Soc.*, 43, 219–25.—C. maintains his statements about these compds. against the criticisms of McIntosh (*C. A.*, 5, 81). H. M. Gordin.

Action of Zinc on a Mixture of Menthone and Allyl Iodide. M. Zaitzev. Org. Lab., Polytechn. Inst., Don. *J. Russ. Phys. Chem. Soc.*, 43, 330–44.—*Allyl-3-menthanol-3*, $C_{13}H_{24}O$ (I), was obtained by the action of Zn and allyl iodide on menthone;



(I)

colorless liquid of slight peppermint odor, b. 246–52°; d_4^{20} 0.90794; n_D^{20} 1.47234; $[\alpha]_D^{20}$ = —56.13°; oxidized with $KMnO_4$ it gives *triatomic alc.*, $C_{13}H_{26}O_3$ (II), an acid $C_{12}H_{22}O_3$



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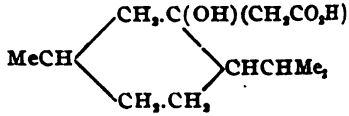
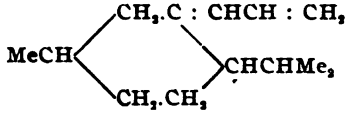


(III)

(III) and $(CO_2H)_2$. The *Ca*, *Ag*, *Ba* and *Zn salts* of (III) were made. By the action of Br (I) was changed to a *dibromide*, $C_{13}H_{24}Br_2O$; brown viscous unstable liquid. Gaseous HCl or HBr changes (I) to a *chloride*, $C_{13}H_{23}Cl$, or a *bromide*, $C_{13}H_{23}Br$, resp. KOH in alc. changes these halides to a *hydrocarbon*, $C_{13}H_{22}$ (b. 212–8°), (IV) or (V) and capable



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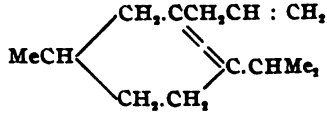
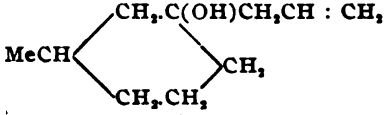


(V)

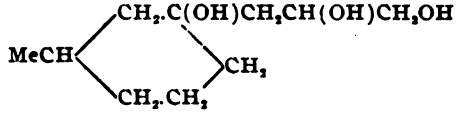
of combining with Br to a *bromide*, $C_{13}H_{22}Br_4$. H. M. Gordin.

Action of Zinc on a Mixture of 1,3-Methylcyclohexanone and Allyl Iodide. M. Zaitzev. Org. Lab., Don Polytechn. Inst. *J. Russ. Phys. Chem. Soc.*, 43, 345–9.—*Methyl-1-allyl-3-cyclohexanol-3*, $C_{10}H_{18}O$ (I), was made by the action of Zn and allyl



(I)

iodide on 1,3-methylcylohexanone; mobil liquid, b. 206–9°; d_0^0 0.92244; d_{20}^{20} 0.91343;



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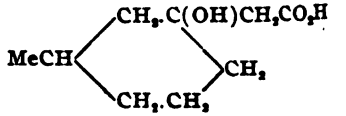

(III)

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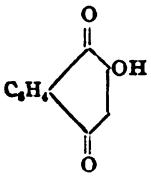
is oxidized by $KMnO_4$ to an *alc.*, $C_{10}H_{20}O_2$ (II), and an *acid*, $C_9H_{18}O_2$ (III). *Ca salt* of (III). H. M. GORDIN.

Action of Ethyl Iodide and Magnesium on Menthone and Carvone. Preliminary Communication. IVAN VANIN. Org. Lab., Don Polytechn. Inst. *J. Russ. Phys. Chem. Soc.*, **43**, 353.—By the action of EtI and Mg or Zn on menthone a *hydrocarbon*, $C_{12}H_{22}$, is formed; b. 195–7°. By a similar reaction carvone yields an *alcohol*, $C_{12}H_{20}O$, b. 248–53°. Oxidation of the latter gives a *triatomic alcohol*. H. M. GORDIN.

Structure of Naphthalic Acid. O. MILLER. Chem. Lab., Prokhorov Mfg. Co., Moscow. *J. Russ. Phys. Chem. Soc.*, **43**, 440–54.—In order to explain the variations in the m. p. of naphthalic acid (2-hydroxy-α-naphthoquinone) the author assumes the acid to consist of a mixture of 2 isomers (I) and (II) in equil., the relative amts.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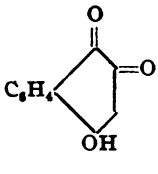
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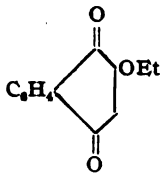
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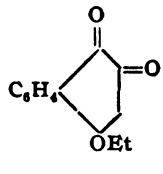
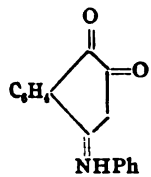

(IV)

of each depending on the temp. of prep. and slowly changing on standing even in the solid condition. This was corroborated by converting the quinone into its ether of which 2 modifications, (III), yellowish red needles, m. 98° and (IV), yellowish warts, m. 127°, were obtained. The constitution of the ethers was established by converting them into anilides; (III) gives an α-monoanilide (VI) together with a dianilide (VII),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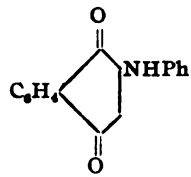
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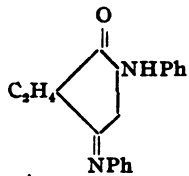
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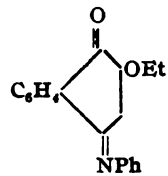
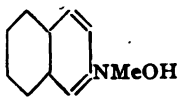

(VIII)

while (IV) gives a β-monoanilide (V) and the same dianilide (VII). In the change from (IV) to (VII) it is supposed that an intermediate product (VIII) is formed. H. M. GORDIN.

Cyclic Ammonium Bases. HERMAN DECKER AND ADOLF KAUFMANN. *J. prakt. Chem.*, **84**, 425–48; cf. *C. A.*, **6**, 75.—In an alk. soln. of isoquinoline methiodide, equil., depending on the conc. of the alk., is established between the isomeric ammonium (I) and carbinol (II) forms, and if the carbinol, either through oxidation, further de-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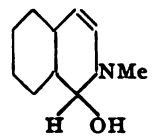
(II)

comp. or extraction by C_6H_6, is removed from the aq. soln., the equil. is disturbed and more of the carbinol is formed at the expense of the ammonium form. The amt. of carbinol in the C_6H_6 ext. can be detd. by conversion into the methochloride by excess of HCl and titration of the acid. On the other hand, when the C_6H_6 soln. is shaken with H_2O a part of the base passes into the H_2O in the ammonium form and can be

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titrated. These aq. solns. show all the properties of aliphatic NH_4 bases and, in contradistinction to the C_6H_6 solns. of the carbinol form, are very stable; after 72 hrs. exposure to the air there was no change in the titer. From 200 cc. of 0.05 *N* methiodide soln. and 200 cc. of 30, 20, 10 and 2% KOH, resp., shaken 10 min. each time with 3 100 cc. portions of C_6H_6, were obtained 39, 39, 31.4 and 9.7% of the carbinol. In a loosely corked vessel, 80–95% of the carbinol (0.6% C_6H_6 soln.) disappears after 48 hrs. From 50 cc. carbinol soln. in C_6H_6 (0.6–0.05%), shaken 10 min. each time with 2 100 cc. portions of H_2O, were obtained 84–8% of the ammonium form, the % in the 1st extract decreasing from 77 for a 0.63% soln. to 57 for a 0.05% soln. The H_2O soln. contains but a minute amt. of the carbinol form. As the conc. of the H_2O soln. is increased, sepns. and decomp. take place, the ammonium form apparently playing the part of an alk. and shifting the equil. in favor of the carbinol form; the equil. exists only between the nonionized part of the ammonium form and the carbinol, and in dil. solns., where the ionization is complete, practically none of the carbinol is present. Both the C_6H_6 and H_2O solns. give *N*-methylisoquinolinium picrate. Similar expts. with quinoline methiodide instead of the isoquinoline compd. gave entirely negative results. Similarly, although there is apparently no reaction when pyridine methiodide is treated with NaOH, $K_3Fe(CN)_6$ quickly oxidizes such a soln. to *N*-methylpyridone (*J. prakt. Chem.*, **47**, 48), indicating that here, too, there is equil. between the ammonium and a carbinol form. Alkylpyridones can be obtained in good yields (75% in the case of the Me compd.) by pouring 3–4 mols. conc. NaOH into a cold aq. soln. of a quaternary salt and the calc. amt. of $K_3Fe(CN)_6$ covered with a layer of C_6H_6, satg. after 15 min. with solid K_2CO_3 and again extracting with C_6H_6. Pure pyridine, obtained by careful fractionation of the com. "Pyridin pur.," b_{710} 116–8°. Quaternary methylpyridinium salts are best prepared by cautiously dropping 1 mol. Me_2SO_4 into pyridine, warming on the H_2O bath and using directly the hygroscopic cryst. mass formed. *N-Methylpyridinium picrate*, needles, m. 113–4°, or rhombohedrons, m. 109–10°. *N-Propylpyridinium bromide-cadmium bromide double salt*, $C_{16}H_{24}N_2Br_4Cd$, needles, m. 117–8°. *N-Propylpyridinium chloride chloroplatinate*, orange-red crystals, m. 196°; *mercuric chloride double salt*, m. 82°. *N-Propyl-α-pyridone*, b_{760} 263–4°; yield, 80%. *N-Isobutylpyridinium iodide*, light yellow, hygroscopic crystals. *Picrate*, leaflets, m. 114°. *Chloroplatinate*, yellow leaflets, m. 220° (decomp.). *N-Isobutylpyridone*, b_{725} 264–5°; yield, 85%. *N-Isoamylpyridinium iodide*. *Picrate*, yellow needles, m. 145°. *Chloroplatinate*, yellow leaflets, decomp. about 200°. *N-Isoamyl-α-pyridone*, b_{730} 283–4°. *3-Bromo-N-methylpyridinium iodide*, yellow, hygroscopic needles, m. 146°. Oxidation with $K_3Fe(CN)_6$ yields a brown oil which, with Br in AcOH, gives *3,5-dibromomethylpyridone*, needles, m. 176°, also obtained by starting from 3,5-dibromopyridine or by brominating methylpyridone. The introduction of positive substituents into quaternary quinoline salts prevents the isomerization into the carbinol form under the influence of alks.; that of negative substituents greatly facilitates the change. *6-Acetamino-1-methylquinolone*, obtained by oxidation of the quinoline methiodide, needles, m. 278°, identical with the product obtained by the acetylation of the aminoquinolone (*Ber.*, **36**, 1174). *6-Aminoquinoline methochloride*, obtained by b. the acetyl deriv. with HCl, lemon-yellow needles, m. 242–3°, sep. with 1 H_2O which it loses in the air. Methiodide, from the methochloride and KI, reddish brown needles, m. 199°, identical with the product obtained from aminoquinoline and MeI (Claus and Schnell, *J. prakt. Chem.*, **53**, 109). Alks. do not react with these compds. in moderately conc. soln. and no quinolone could be obtained. In conc. soln. the methochloride forms with 35% NaOH red microscopic needles with green metallic luster, m. 166°, which seem to have the comp. $H_2NC_9H_6NMeI.H_2NC_9H_6NMeOH.3H_2O$, analogous to the compd. obtained by Claus and Mohl from *p*-hydroxyquinoline ethiodide. 6,8-Dinitroquinoline methiodide easily forms with alks. 6,8-

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dinitro-1-methylquinolanol, $(O_2N)_2C_6H_2\langle\begin{matrix}CH=CH\\ |\\ NMe.CHOH\end{matrix}\rangle$ (cf. Kaufmann, *C. A.*, **5**, 1908). *Isobutyl ether*, light brown crystals, m. 87°. 6-Bromo-8-nitroquinoline, m. 170-7°; methiodide, dark reddish brown needles, decomp. about 185–6°. *6-Bromo-8-nitromethylquinolanol*, yellow cryst. powder, m. 173–5°. *Methyl ether*, brownish yellow crystals, m. 121–2°. *Ethyl ether*, prisms, m. 111°. *3-Bromo-8-nitro-1-methylquinolanol*, yellow needles. *Ethyl ether*, light brown prismatic crystals, m. 90–1°.

CHAS. A. ROUILLER.

Reactivity of Benzene Substituents and the Acidity of Aromatic Acids in Relation to Orientating Influences: Contribution to the Structure of Benzene. JUL. OBERMILLER. Inst. Elek.-Chem. u. techn. Chem. k. techn. Hochsch., Stuttgart. *J. prakt. Chem.*, **84**, 449–59; cf. *C. A.*, **5**, 1086; Holleman, *Ibid.*, 1911.—The 3 mono-Na phenolsulfonates (in amts. corresponding to 0.2 g. phenol) were heated in sealed tubes at 100° with 20 cc. HCl (d. 1.19) for 7 and 9 hrs., resp., and the % of SO_3 split off detd. by weighing as $BaSO_4$, with the following results: *o*-, 97.4, 98.9; *p*-, 31.2, 37.9; *m*-, 0. 0. 100 cc. of 0.2 *N* solns. of the mono-Mg salts were treated with 1 g. MgO, filtered after several ds., and the amt. of Mg dissolved detd. by titration of the filtrate with HCl and methyl orange; the results, expressed in pts. of 1 at. Mg, were: *o*-, 0.995; *p*-, 0.97; *m*-, 0.91. These results are in harmony with many others obtained by the author indicating the correctness of the diagonal C_6H_6 formula. But the detn. of the H^+ ion conc. of the mono-Na salts by means of the H-$HgCl_2$ electrode gave the following values: (0.2 *N* solns.): *o*-, 2.8×10^{-6}; *p*-, 5.06×10^{-4}; *m*-, 4.3×10^{-4}; or *o* : *m* : *p* = 1 : 153.6 : 180.7; results agreeing with the Kekulé formula. From these and various other known facts it seems that the C_6H_6 ring can exist in 2 tautomeric forms.

CHAS. A. ROUILLER.

Cholesterol Ethers. WILHELM STEINKOPF AND ERWIN BLÜMMER. Chem. Inst. techn. Hochsch., Karlsruhe. *J. prakt. Chem.*, **84**, 460–72.—As cholesterol ethers are of great interest in connection with the problem of the origin of petroleum, the properties of those described in the literature were studied and a no. of new ones prepared. Lindenmeyer's supposed cholesteryl ether, $(C_{27}H_{45})_2O$, obtained by the action of EtI on the Na salt (*J. prakt. Chem.*, [1] **90**, 321), was probably impure cholesterol, as the reaction proceeds as represented in the equation $C_{27}H_{45}OK + EtI = KI + C_{27}H_{45}OH + C_2H_4$. $C_{27}H_{45}Cl$ reacts like EtI. Similarly, $C_{27}H_{45}Cl$, heated with ZnO or Zn dust (Mauthner and Suida, *Monatsh.*, **17**, 40) or with CaO or Ag_2O, gave cholesterylene, $C_{27}H_{44}$. On heating $C_{27}H_{45}OH$ with anhydrous $CuSO_4$, however, as proposed by M. and S., $(C_{27}H_{45})_2O$ can be obtained with good yields. *Phenyl cholesteryl ether*, obtained by heating PhONa with $C_{27}H_{45}Cl$ 2–3 hrs. at 155–60°, silvery leaflets, m. 157.5°, $[\alpha]_D$ —34.64° to —35.13° ($CHCl_3$ soln.). *p-Cresyl cholesteryl ether*, leaflets, m. 154.5°, $[\alpha]_D$ —32.95°. *Benzyl cholesteryl ether*, obtained by heating $C_{27}H_{45}OK$ and BzCl in a bomb 12 hrs. at 100°, needles, m. 118.5°, $[\alpha]_D$ —26.02°. Obermiller's product, m. 78° (*Z. physiol. Chem.*, **15**, 44), was probably a mixt. with $C_{27}H_{45}OH$. *p-Methylbenzyl cholesteryl ether*, from *p*-$MeC_6H_4CH_2Br$ and $C_{27}H_{45}OK$, m. 129–30° to a turbid, opalescent liquid, becoming clear at 141.5°; on cooling, the same phenomena take place in reverse order, the turbid liquid passing, in incident light, through deep violet, blue, green, red and finally pink (cf. Lehmann, *Physik. Z.*, 1910, 9); $[\alpha]_D$ —26.3°. *m-Methylbenzyl cholesteryl ether*, m. 93–4° to a turbid liquid which clears up at 125°, $[\alpha]_D$ —31.76°. When heated 4 hrs. at 330–50°, these ethers give first inactive, then *d*-rotatory products. Those in which the O is combined directly with a C_6H_6 ring are not attacked by cold, conc. H_2SO_4.

CHAS. A. ROUILLER.

Synthesis of some New Hydroaromatic Ketones. G. DARZENS AND H. ROST.

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Compt. rend., **153**, 772–5.—Acid chlorides, prepared from the acid and $SOCl_2$, are treated, in their own wt. of Et_2O at —10°, drop by drop, with Grignard's reagents, the products decomp. by ice in the usual way and the ketones purified from the small amts. of tertiary alc. always formed through their semicarbazones. Yields from satd. acids, about 60%; from ethylene compds., 40%. *Tetrahydrobenzoyl chloride*, b_{11} 86°. *Hexahydrobenzoylcyclohexene*, b_9 136°; *semicarbazone*, m. 117–8°. *Hexahydrobenzoyl chloride*, b_{17} 76°. *Butyrylcylcohexane*, b_{13} 94°; *semicarbazone*, m. 153–4°. The following AcOH derivs. were prepared by the method already described (*Compt. rend.*, **144**, 326): *Cyclohexeneacetyl chloride*, b_{13} 90–1°. *Hexahydrophenylacetyl chloride*, b_{22} 98–100°. *o-Methylcyclohexeneacetyl chloride*, b_{13} 104–5°. *m-Methylcyclohexeneacetyl chloride*, b_6 82–4°. *m-Methylhexahydrophenylacetyl chloride*, b_{11} 95–6°. *p-Methylcyclohexeneacetyl chloride*, b_8 109–10°. *p-Methylhexahydrophenylacetyl chloride*, b_7 75°. *Ethyl methylbutylhydroxyhexahydrophenylacetate*, b_3 129–31°. *Methylbutyltetrahydrophenylacetic acid*, b_{10} 174–7°; *ethyl ester*, b_{10} 136–9°; *chloride*, b_8 127–8°. *Methylbutylhexahydrophenylacetic acid*, b_{12} 173–6°; *ethyl ester*, b_{14} 146–9°; *chloride*, b_{12} 134–6°. From the above chlorides were obtained: *Cyclohexeneacetone*, b_{11} 79–80°; *semicarbazone*, m. 143°. *Hexahydrophenylacetone*, b_{13} 83–5°; *semicarbazone*, m. 176°. *o-Methylcyclohexeneacetone*, b. 212°; *semicarbazone*, m. 170°. *m-Methylcyclohexeneacetone*, b. 206–7°; *semicarbazone*, m. 146°. *m-Methylhexahydrophenylacetone*, b. 207°; *semicarbazone*, m. 154°. *p-Methylhexahydrophenylacetone*, b. 208°; *semicarbazone*, m. 160–1°. *Methylbutylcyclohexeneacetone*, b_{11} 135–6°; *semicarbazone*, m. 206°. CHAS. A. ROUILLER.

Constitution of the Monomethyl Ether of Weselsky and Benedikt's Dinitrohydroquinone. Preparation of some Methyl Derivatives of the Dinitro-*p*-anisidines. FRÉDÉRIC REVERDIN AND ARMAND DE LUC. Lab. chim. org., univ. Genève. *Arch. sci. phys. nat.*, **32**, 343–6.—*2,6-Dinitro-p-dimethylanisidine*, orange-yellow needles, m. 150°, is easily obtained from $MeOC_6H_2(NO_2)_2NH_2$ and Me_2SO_4 in MeOH; heated a few moments on the H_2O bath with HNO_3 (d. 1.52), it yields a *nitroamine*, slightly yellow, prismatic needles, m. 139–40°, sol. in conc. H_2SO_4 with fuchsin-red color. It is not the same as the nitroamine m. 125° (*C. A.*, **5**, 1089) which, with 4% NaOH, yields W. and B.'s dinitrohydroquinone Me ether, thus proving experimentally that the latter is 3,5-dinitro-1-methoxy-4-hydroxybenzene. 3,5-Dinitro-*p*-anisidine could not be methylated with Me_2SO_4, but the other 2 isomers give monomethyl compds. *2,3-Dinitro-p-methylanisidine*, $MeOC_6H_2(NO_2)_2NHMe$, dark red needles, m. 150–6°. *2,5-Dinitro-p-methylanisidine*, dull red, felted needles, m. 201–2°. CHAS. A. ROUILLER.

Photochemical Reactions of the Nitrophenylindones. I. M. BAKUNIN AND E. LANIS. Ist. chim. r. univ. Napoli. *Gazz. chim. ital.*, **41**, II, 155–84.—Phenyl-*o*-nitroindone, m. 139°, which is red, when exposed to sunlight in Et_2O, C_6H_6, or $CHCl_3$, is converted into a mixt. of 3 white compds., m. about 218°, 280° and 320°, resp. All are but slightly sol. in ordinary solvents, apparently have the same % comp. as the original substance, do not combine with $PhNHNH_2$, and do not substitute their O with 2 Cl ats. when treated with PCl_5. In the solid state, only 1 product, that m. about 320°, is formed. That m. around 280° combines with 1 C_6H_6. The 2 higher-melting substances are the more stable, the one m. about 220° passing back into the original indone on fusion. Owing to their slight solubility, their mol. wt. could not be detd., but from analogy with the behavior of phenylindone, the one m. 320° is probably a dimer of the nitrophenylindone. Likewise, the analogous behavior of phenylindone would indicate that the NO_2 group plays no part in the phenomenon; the polymerization probably takes place through the carbonyl O, with simultaneous opening of the double bond, the 2 valences thus set free satg. the ethylene valences in another mol. of indone. CHAS. A. ROUILLER.

Chlorinated Ethers. VI. 1,2-Dichloro-, 1,2,2'-Trichloro- and Tetrachloro-s-

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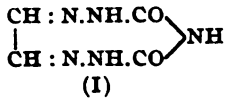
propyl Ethers. GIUSEPPE ODDO AND GUIDO CUSMANO. Cagliari-Pavia, ist. chim. gen. univ. *Gazz. chim. ital.*, 41, II, 224–45.—The structure of 1,2-dichloro-*n*-propyl ether, MeCHClCHClOPr (*Ibid.*, 33, II, 372), was detd. as follows: Treated with conc. H_2SO_4 at 135–40° (cf. 2nd abstr. following), it gives *α-chloropropionic aldehyde*, b. 85–6° (cf. Brochet, *Ann. chim. phys.*, [7] 10, 335) which, on standing, especially if it contains HCl, is converted into a white amorphous *polymer*, almost insol. in org. solvents, does not m. but is depolymerized at 170–200°; when treated with 1 mol. H_2O, heat is evolved, the pungent odor of the aldehyde disappears, and on cooling the mixt. becomes almost solid, but the *hydrate* could not be obtained in cryst. form. With PrOH, a similar phenomenon is observed, but on distilling the product a fraction b. 105° is obtained; mol. wt. detns. indicate that the *propyl alcoholate*, MeCHClCH(OH)OPr, is 11.3% dissociated. B. with 2 vols. of H_2O, the dichloro ether gives MeCHClCHO and $MeCHClCH(OPr)_2$; the latter compd. is also obtained by b. the dichloro ether with 1 mol. PrOH; with conc. H_2SO_4, it gives MeCHClCHO. B. a long time without a solvent, the ether forms *2-chloroprophenyl propyl ether*, MeCCl : CHOPr, b. 145–6.5°; conc. H_2SO_4 decomp. it into MeCHClCHO; with Br in $CHCl_3$ it forms *2-chloro-1,2-dibromopropyl ether*, b. 140–2°; $AgNO_3$ ppts. all of the 1-Br and part of the 2-Cl and -Br, and with pyridine and $PtCl_4$ it forms a *compound* $(C_6H_{10}OClBr.C_5H_5N)_2PtCl_4$, yellow crystals, m. 216–7°. The ether MeCHClCHClOPr was also synthesized by satg. MeCHClCHO and PrOH with dry HCl. *1,2,2'-Trichloro-n-propyl ether*, MeCHClCHClOCH$_2$CHClMe, obtained by treating Pr_2O at 25° and finally on a b. NaCl bath with Cl until 3 ats. have been absorbed, or by starting from the dichloro ether, b_{5-10} 115–20°, is decomp. by conc. H_2SO_4 into MeCHClCHO, HCl and PrCl, loses only 1 Cl at. with $AgNO_3$, forms, with pyridine and $PtCl_4$, the *compound* $(C_6H_{11}OCl_3.C_5H_5N)_2PtCl_4$, orange-yellow crystals, m. 187°. The ether can be synthesized from MeCHClCHO, CH_2: $CHCH_2OH$ and HCl. *Tetrachloro-n-propyl ether*, b_{5-10} 157–62°, obtained in the prep. of the trichloro ether, gives MeCHClCHO with H_2SO_4, loses 1 at. Cl with $AgNO_3$, forms the *compound* $(C_6H_{10}OCl_4.C_5H_5N)_2PtCl_4$, orange-yellow crystals, m. 187°. **VII.. Aldehyde Condensation by means of Halogen Ethers.** *Ibid.*, 246–58.—$CHCl_2CHO$ and urea in H_2O give *dichloroethylidenehydroxyurea*, $CHCl_2CH(OH)NHCONH_2$, prisms, m. 142° (decomp.) with loss of H_2O and formation of dichloroethylideneurea (Schiff, *Ann.*, 151, 208), easily hydrolyzed. It can also be obtained from the polymer of $CHCl_2CHO$, or from $CHCl_2CHClOEt$ in the presence of NaOAc. With N_2H_4 in the presence of NaOAc, the chloro compds. above form a yellowish red amorphous powder, sol. in conc. acids or alks., reacts energetically (flames) with conc. HNO_3, contains N but no Cl, does not m. below 300°. With $H_2NCONHNH_2$ is obtained a yellowish powder, sol. in alks., probably (I) or (II). $PhNHNH_2$ gives $(CH : NNHPh)_2$. From MeCHClCHO or the di-, tri- or tetrachloropropyl ethers (cf. preceding abstr.) and urea in EtOH-H_2O soln. is obtained the *compound* $MeCHClCH : NCONH_2$, amorphous powder, m. 167–70° (decomp.). H_2NCO_2Et gives *2-chloropropylideneurethan*, $MeCHClCH(NHCO_2Et)_2$, silky needles, m. 122–3°. From MeCClBrCHBrOPr and H_2NCO_2Et is obtained *2-chloro-2-bromopropylidenediurethan*, $MeCClBrCH(NHCO_2Et)_2$, quadrangular prisms, m. 113–5°; with urea, a *compound*, m. 183–4°, minute needles.



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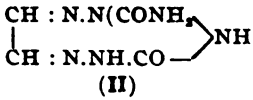

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CHAS. A. ROUILLER.

Catalytic Action of Sulfuric Acid. I. GIUSEPPE ODDO. Cagliari-Pavia, ist. chim. gen. *Gazz. chim. ital.*, 41, II, 258–67; cf. preceding abstrs.—To decomp. ethers of the type described above, they are added, drop by drop, to H_2SO_4, which has been

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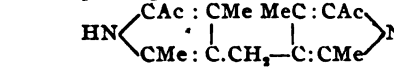
conc. until SO_3 fumes are evolved and is kept at the temp. best adapted for the decomp. of the compd. under investigation. The decomp. products begin to distil over at once, and the heating should be stopped as soon as all of the ether has been added. In this way were obtained, at 140–5°, $CHCl_2CHO$ from $CHCl_2CHClOEt$ (58%), from $CHCl_2CHO.H_2O$ (73%), from $CHCl_2CH(OEt)_2$ (38%) and from $CCl_2:CHOEt$ (21%). From the propyl ethers described in the preceding abstr. and from MeCHClCH$(OPr)_2$ and MeCCl:CHOPr is obtained MeCHClCHO in good yields. From $AcCH_2CO_2Et$ at 155–65° is obtained AcOEt, and $CH_2:CO$ could be detected by means of $PhNH_2$ but it is resinified by the acid; $CH_2(CO_2Et)_2$ at 200° gives AcOEt, CO_2 and $CH_2:CH_2$; while $(CH_2CO_2Et)_2$ at 240–50° yields only $(CH_2CO_2H)_2$, EtOH and H_2O. C. A. ROUILLER.

Basicity of Organic Acids Containing Alcoholic Hydroxyl Groups. G. CALCAGNI AND L. BERNARDINI. *Atti accad. Lincei*, 20, II, 309–12; cf. *C. A.*, 6, 84.—The elec. cond. of malic, tartaric and citric acids to which are added varying amts. of NH_3 shows the same general phenomena as that of the acids reported in the preceding paper. The results thus far obtained do not permit of drawing any conclusions as to the functions of the alc. OH groups; they neither exclude the formation by these groups of salts, nor show that salts are formed. CHAS. A. ROUILLER.

Action of Aldehydes on Pyrrole Compounds. U. COLACICCHI. Ist. chim. gen. univ. Parma. *Atti accad. Lincei*, 20, II, 312–7.—The formation of dipyrrylmethane derivs. from aldehydes and pyrrole compds. is not limited to aromatic aldehydes, provided the pyrrole compds. contain but 1 free methene H and have a negative radical in the mol. The condensation with HCHO takes place more easily, a 40% soln. of HCHO and an alc. soln. of the pyrrole compd. containing a trace of HCl being used. With other aldehydes no solvent is used, the condensing agent being a little $ZnCl_2$ and the mixt. being heated on the H_2O bath for a longer or shorter period, depending on the mol. wt. of the aldehyde. *Bis-(2,4-dimethyl-5-acetylpyrryl)methane*,  , yellowish scales or clustered needles, m. 272°. *Bis-(2,4-dimethyl-3-acetylpyrryl)methane*, yellow cryst. powder, m. 268°. *Bis-(2,4-dimethyl-5-benzoylpyrryl)methane*, needles, m. 257–8°. *Bis-(2,4-dimethyl-5-acetylpyrryl)methylmethane*, yellowish needles, m. 253°. *Bis-(2,4-dimethyl-3-acetylpyrryl)methylmethane*, slightly pink scales, m. 254°. *Bis-(2,4-dimethyl-5-benzoylpyrryl)methylmethane*, minute prisms, m. 244–5°. *Bis-(2,4-dimethyl-5-benzoylpyrryl)propylmethane*, yellow prisms, m. 217–8°. *Bis-(2,4-dimethyl-5-benzoylpyrryl)isopropylmethane*, yellowish flocks, softens 80°, becomes spongy 100°, m. 180°. *Bis-(2,4-dimethyl-5-benzoylpyrryl)hexylmethane*, yellow, cryst. powder, m. 178–9°. These compds. are all very slightly sol. in the usual solvents, but are sol. in conc. acids. C. A. R.

Essence of Santolina chamaecyparissus L. II. Action of Hydroxylamine. L. FRANCESCONI AND P. SCARAFÍA. Ist. chim. gen. r. univ. Cagliari. *Atti accad. Lincei*, 20, II, 318–24; cf. *C. A.*, 6, 137.—The essence, b. 12–20 hrs. in aq. alc. with $NH_2OH.HCl$ and $NaHCO_3$, gives, in proportions depending on the fraction of essence used, a hydroxylamineoxime and an oxime of a ketone $C_{10}H_{16}O$, an oxime of another ketone, a simple hydroxylamine, and terpene and other unchanged components of the essence. The *terpene* b. 165–70° and contains 1 double bond. The *hydroxylamine*, hexagonal lamellas from Et_2O, m. 62–4°; sol. in H_2O, exhibiting the same rapid gyrations as camphor when placed on this liquid; reduces hot Fehling's soln. without previous b. with HCl; is easily oxidized by HgO; gives a white cryst. *nitroso derivative* which turns blue in soln. or on m. (60–2°). The *oximes* are oily liquids lighter than H_2O, reduce Fehling's soln. after b. with HCl and are hydrolyzed to a mixt. of *carbonyl compounds*. The *hydroxylamineoxime*, $C_{10}H_{17}(:NOH)NHOH$, is a white, silky substance; 3 g. dissolve in 50 cc. of hot 96% alc.; it reduces hot Fehling's soln. but only after b. with

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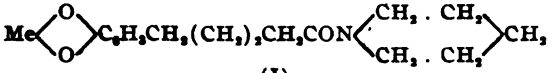
HCl a few moments; it softens 180–5°, m. 190°, while crystals gradually sep. until the whole mass becomes solid and then m. above 260°; if the heating is done slowly, the transformation takes place without passing through the liquid stage. With HNO_2 it gives a *dioxime*, $C_{10}H_{16}(NOH)_2$, prisms, m. 268° (decomp.), sol. in dil. acids or alks. and yielding a *dibenzoyl derivative*, m. 150–5°. The hydroxylamineoxime, when heated about 1 hr. at 190–200°, is partly oxidized to the dioxime and partly reduced to an *amino-oxime*, $C_{10}H_{17}(:NOH)NH_2$, prisms, m. 150°. CHAS. A. ROUILLER.

Δ-1,5-Dihydrocuminal. The β-Phellandrene in the Essence of Bupleurum fruticosum. L. FRANCESCONI AND E. SERNAGIOTTO. Ist. chim. gen. univ. Cagliari. *Atti accad. Lincei*, **20**, II, 325–31; cf. *C. A.*, **6**, 137.—The compd. $C_{10}H_{14}O$ obtained from the nitrosochloride of the essence is Δ-1,5-dihydrocuminaldehyde, therefore the terpene from which it is derived must be β-phellandrene, although its rotatory power is higher than that of β-phellandrenes obtained from other sources. C. A. ROUILLER.

Hydrates of Potassium Acetate: Their Solubility and Transition Point. RYUJI ABE. *Mem. Coll. Sci. Eng. Kyoto Imp. Univ.*, **3**, 211–5.—The solubility of KOAc varies from 216.7 g. in 100 g. H_2O at 0.1° to 406.5 g. at 96°, with a break in the curve at 41.3°. Crystals obtained below that temp. have the comp. $2KOAc.3H_2O$; those above that temp., $2KOAc.H_2O$. As they are very hygroscopic, a little $Sr(OAc)_2$ was added to the soln., the soln. and the crystals wet with it analyzed and the amt. of mother liquor adhering to the latter detd. from the amt. of Sr found. C. A. R.

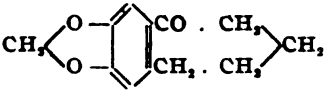
Reduction Catalysis. V. Alkaloidal Hydrogenation. A. SKITA AND H. H. FRANCK. Chem. Techn. Inst., Techn. Hochsch., Karlsruhe. *Ber.*, **44**, 2862–7; cf. Oldenberg, *C. A.*, **5**, 3261.—The reductions described below were made in acid solns., at the ordinary temp. with Pd and H, in aq. gum arabic. Under 1.5 atms., phorone gives valerone. Strychnine (2 atms.) forms *dihydrostrychnine*, $C_{21}H_{24}O_2N_2$; small, white needles, m. 209–10°. Under 3 atms. the product is tetrahydrostrychnine. Under similar conditions brucine gives *dihydrobrucine*, $C_{23}H_{28}O_4N_2$; small, spherical aggregates from AcOEt, m. 115°. Morphine hydrochloride forms dihydromorphine. Yield, 80%. Codeine hydrochloride gives *dihydrocodeine*, $C_{18}H_{23}O_3N$; crystals from alc., m. 65°. Quinine and cinchonine hydrochlorides give the dihydro derivs. From piperine is produced *tetrahydropiperine*; strongly basic oil with a pleasant odor, b_{14} 261° (cf. following abstr.). J. BISHOP TINGLE.

Tetrahydropiperine and Tetrahydropiperic Acid. W. BORSCHE. Gen. Chem. Inst., Univ. Göttingen. *Ber.*, **44**, 2942–5; cf. preceding abstr.—Colloidal Pd and H, in alc., at the ordinary temp., reduce piperine to *tetrahydropiperine δ(-3,4-methylenedioxyphenylvalerpiperidide)*, formula (I) below; colorless oil, b_{16} 280°. Yield, quant.



(I)

Alc. KOH hydrolyzes it to tetrahydropiperic acid, $CH_2:C_6H_3CH_2(CH_2)CH_2CO_2H$, which is identical with Fittig and Buri's "piperhydronic acid," m. 100–1°, not 96°. *Methyl ester*, colorless, odorless oil, b_{16} 193–5°. *Chloride*, mobil oil, decomp. when heated. *Amide*, white, lustrous plates from dil. MeOH, m. 110°. In CS_2, at 0°, $AlCl_3$ converts the chloride into *methylenedioxybenzosuberenone* (II); oil. *Semicarbazone*,



(II)

small, white needles from alc., m. 238–9° (gas evolution). J. BISHOP TINGLE.

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Synthesis in the Aliphatic-Aromatic Series. J. v. BRAUN. Chem. Inst., Univ. Breslau. *Ber.*, 44, 2867–81.—The compds, described below were prepared as follows: (A) RCN ⟶ RNH_2 ⟶ RNHBz ⟶ RCl; (B) RCN ⟶ RCO_2H ⟶ RCO_2Et ⟶ ROH ⟶ RCl; (C) RCl ⟶ RCO_2Et ⟶ ROH ⟶ RCl (R = $Ph(CH_2)x$; R′ = $Ph(CH_2)x + 1$). The method actually employed in each case is indicated by the letters (A), (B), or (C). Benzyl cyanide (A) gives β-chloroethylbenzene. Yield, above 30%. The yield of phenylbutyl chloride is (A) 50%; (B) greater, and greatest from phenylpropyl bromide (Grignard). *Ethyl γ-phenylbutyrate*, $PhCH_2CH_2CH_2CO_2Et$ (B); oil, b_{10} 130–1°. Yield, 95%. *δ-phenylbutyl alcohol*, $PhCH_2(CH_2)_2CH_2OH$ (B), colorless liquid with a strong odor, b_{14} 140°. Yield, 70%. *Phenylurethan*, crystals from Et_2O + ligroin, m. 51–2°. *δ-Phenylbutyl bromide*, $PhCH_2(CH_2)_2CH_2Br$, from the alc. and fuming HBr, at 100°; colorless liquid, b_{12} 131–3°. *ε-Phenylamyl alcohol*, $PhCH_2(CH_2)_3CH_2OH$, from the preceding compd., Mg and paraformaldehyde; colorless oil, b_{20} 155°. Yield, 50%. *Acetate*, from the chloride and AcOK; oil with a pleasant odor, b_{12} 155°. It is the best source of the alc., which it gives in quant. yield. *Urethan*, oily. *ε-Phenylpentyl nitrile*, $PhCH_2(CH_2)_3CH_2CN$, from the iodide; colorless liquid, b_{13} 160–4°. Yield, about 90%. *ε-Phenylhexoic acid*, $PhCH_2(CH_2)_4CH_2CO_2H$, (A), water-clear oil, b_{17} 180–90°. Yield, 80%. *Silver salt*, white, curdy and stable towards light. *Ethyl ester*, colorless oil, b_{13} 161–3°. Yield, 90%. *6-Phenylhexylamine*, $PhCH_2(CH_2)_4CH_2NH_2$ (A), colorless oil, b_{15} 144–6°. It absorbs H_2O and CO_2 from the air. Yield, 75%. *Picrate*, m. 99–100°. *Chloroplatinate*, darkens 200°, m. 216–20° (decomp.). *Chloroaurate*, m. 71–2°. *6-Phenylhexyltrimethylammonium iodide*, $PhCH_2(CH_2)_4CH_2NMe_3I$, crystals from H_2O, m. 172°. *Benzoyl derivative*, crystals, m. 59–61°. *6-Phenylhexyl chloride*, $PhCH_2(CH_2)_4CH_2Cl$ (A), colorless liquid with a pleasant odor, b_{15}(?) 142–6°. Yield, 70% of the amine, 49% of the phenylamyl chloride. *6-Phenylhexyl iodide*, from the chloride and NaI, colorless, odorless liquid, b_{15} 168–73°. *6-Phenylhexyl alcohol*, $PhCH_2(CH_2)_4CH_2OH$ (B), liquid, b_{12} 160–1°. Yield, 73% of the ester, 50% of the cyanide. *Acetate*, from the chloride; liquid with a slight odor, b_{12} 166–8°. At 120°, conc. HCl converts phenylhexyl alc. into a phenylhexyl chloride, which is identical with that from phenylhexylamine and PCl_5. *6-Phenylhexyl bromide*. from the alc. and conc. HBr; liquid, b_{17} 160–1°. *6-Phenylhexyl cyanide*, $PhCH_2(CH_2)_4CH_2CN$, from the iodide (A); colorless liquid with an intense odor when dil., b_{15} 173–8°. Yield, over 95%. *6-Phenylheptoic acid*, $PhCH_2(CH_2)_4CH_2CO_2H$ (B), almost odorless liquid, b_{17} 205–10°. *Silver salt*, white, curdy and unstable to light. *Amide*, white plates, from Et_2O + petroleum ether, m. 89°. *Ethyl ester*, oil with an unpleasant odor, b_{16} 175–7°. Yield, 80% of the cyanide. *7-Phenylheptyl alcohol*, $PhCH_2(CH_2)_5CH_2OH$, (B), liquid with a slight odor of roses, b_{15} 170–2°. Yield, 50% of the phenylhexyl chloride. *Acetate*, from the chloride (see below) and AcOK; liquid with a slight odor, b_{24} 188–90°. *7-Phenylheptylamine*, $PhCH_2(CH_2)_5CH_2NH_2$, (A), liquid with a slight odor, b_{16} 159–60°. It absorbs CO_2 from the air. Yield, 72%. *Picrate*, m. 120–2°. *Chloroplatinate*, darkens 200°, m. 210–3° (decomp.). *Chloroaurate*, pale yellow plates, m. 103°. *7-Phenylheptyltrimethylammonium iodide*, $PhCH_2(CH_2)_5CH_2NMe_3I$, crystals from H_2O, m. 164°. *Benzoyl derivative*, oily. *7-Phenylheptyl chloride*, $PhCH_2(CH_2)_5CH_2Cl$, (A), colorless liquid with a slight odor, b_{17} 159–64°. Yield, 77% of the amine. *7-Phenylheptyl iodide*, from the chloride and NaI; colorless liquid, b_{17} 179–84°. With NMe_3 it gives a trimethylammonium iodide (m. 164°) identical with that from the amine above. *7-Phenylheptyl bromide*, from the alc. and conc. aq. HBr, at 125°; b_{15} 170–5°. J. BISHOP TINGLE.

Density of Absolute Ethyl Alcohol at 25°. ANTON KAILAN. *Ber.*, 44, 2881–4.—The alc. employed was dehydrated by distilling twice over Ca turnings. The corrected value for d_4^{25} is 0.78513 (±0.00001). Esterification with BzOH + HCl gave,

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as mean values, 27 and 28 for $W.10^3$. $W = 0.15(K_o - K/K)$; $K_o = 0.00705$. W = 0.5 of the H_2O produced in the time t (cf. Goldschmidt and Udby (*C. A.*, **2**, 261)).

J. Bishop Tingle.

Constituents of Ethereal Oils. Composition of the Ethereal Oils from Xanthoxylum aubertia Cordemoy (Evodia aubertia Cordemoy) and from Xanthoxylum alatum Roxb. F. W. Semmler and E. Schossberger. Techn. Hochsch., Breslau. *Ber.*, **44**, 2885–90.—The ethereal oil from *X. aubertia* (*E. aubertia*), was fractionated (16 mm.). The portion b. 70–80° (2–3%) consisted of an *aliphatic terpene*, $C_{10}H_{16}$; d_{20} 0.8248; n_D 1.49775; α_D 30.° After repeated distillation over K and Na it polymerized, the *product* b_{16} 140–50°; d_{20} 0.8248; n_D 1.47751. The second fraction of the original oil, b. 115–30° (80–90%) consisted of a mixt. which was sepd. by aq. $KMnO_4$. A portion was oxidized to 3,4-dimethoxybenzoic acid and the remainder was a *sesquiterpene*, $C_{15}H_{24}$; b_9 119–23°; d_{20} 0.8781; n_D 1.49900; α_D —58°; mol. ref. 68.19. The substance which was oxidized consisted of methyleugenol, as was proved by its reaction with aq. KOH + amyl. alc. and also with Br. The third fraction (10%) consisted of 2-hydroxy-4,6-dimethoxyacetophenone. It was also present in the third fraction of oil from *X. alatum*. The first fraction of this latter oil, b_9 50–60° (about 80%) consisted of a *hydrocarbon*, $C_{10}H_{16}$, possibly *l-sabinene*; d_{20} 0.840; n_D 1.47457; α_D —26°. *Hydrochloride*, $C_{10}H_{16}.HCl$, b_{10} 83–7°; d_{20} 0.959; n_D 1.4824; α_D —11°. Reduction with Na and alc. converts it into a *hydrocarbon*, $C_{10}H_{18}$, b_9 52–8°; d_{20} 0.8275; n_D 1.4582; α_D —17°. With O_2 it gives an *acid*, b_{10} 174–80°. From the hydrocarbon, $C_{10}H_{16}$, and O_2 a *ketone* was obtained; b_{14} 102–6°; d_{20} 0.9612; n_D 1.47064; α_D 14°. The second fraction of the oil, b_{15} 90–120° (5–10%) consists of 2 *ketones*, the *semicarbazones* of which m. 210–1° and 221°, resp.

J. Bishop Tingle.

Aliphatic Nitro Compounds. XI. α-Nitroisobutyric Acid. Wilhelm Steinkopf and Alexander Supan. Chem. Inst. Techn. Hochsch., Karlsruhe and Univs. Breslau and Würzburg. *Ber.*, **44**, 2891–7; cf. *C. A.*, **5**, 3234.—*α-Nitroisobutyronitrile*, O_2NCMe_2CN, is prepared from hydroxylaminoisobutyronitrile, dil. H_2SO_4 and aq. $KMnO_4$, below 30°; oil, b_{12} 73°. Yield, 64% of the nitrile. With abs. MeOH, dry Et_2O and dry HCl, at the temp. of ice + salt, it is converted into *nitromethoxyisobutyrinine, hydrochloride*; $O_2NCMe_2C(:NH)OMe.HCl$, white crystals. It is hydrolyzed by H_2O, at the ordinary temp., to *methyl α-nitroisobutyrate*, $O_2NCMe_2CO_2Me$; oil, b_{12} 73–4°. With conc. aq. NH_3 it gives the amide. *α-Nitroisobutyric acid*, $O_2NCMe_2CO_2H$, from the ester and aq. HCl, satd. at —10 to —20°, at the ordinary temp.; crystals, m. 93–4°. *Ammonium salt*, from dry NH_3, in Et_2O; white, unstable solid. With $NaNO_2 + H_2SO_4$ it gives propylpseudonitrole, O_2NCMe_2NO. *Sodium salt*, $C_4H_6O_4NNa$, from the acid and EtONa, in alc.; white solid. *Phenylhydrazine salt*, $C_{10}H_{15}O_4N_3$, white, unstable plates.

J. Bishop Tingle.

Action of Hydrogen Chloride and Methyl Alcohol on Negative Substituted Nitriles. Wilhelm Steinkopf and Wiatscheslaw Malinowski. Chem. Inst. Techn. Hochsch., Karlsruhe. *Ber.*, **44**, 2898–904.—The results described below, unless otherwise stated, were obtained by treating the resp. nitriles, in a freezing mixt., with abs. MeOH, dry Et_2O and dry HCl. Chloroacetonitrile gave *methoxychloroacetimide hydrochloride*, $ClCH_2C(:NH)OMe.HCl$, white crystals. Yield, 130% of the nitrile. Dichloroacetonitrile gave dichloroacetamide. Trichloroacetonitrile and EtOH, or dimethylethylcarbinol gave trichloroacetamide. Bromoacetonitrile gave *methoxybromoacetimide hydrochloride*, $BrCH_2C(:NH)OMe.HCl$; slender, white needles. Dibromoacetonitrile gave dibromoacetamide and *methoxydibromoacetimide hydrochloride*, $Br_2CHC(:NH)OMe.HCl$, which were sepd. by recrystn. from H_2O. The hydrochloride is the more readily sol.; oil. Tribromoacetonitrile gave tribromoacetamide. Iodoacetonitrile gave *methoxyiodoacetimide hydrochloride*, $ICH_2C(:NH)OMe.HCl$; heavy red oil. Di-

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chloronitroacetonitrile gave dichloroacetamide. Phenylnitroacetonitrile was purified by treating the dry Pb salt, in dry Et_2O, with H_2S; white, unstable crystals, m. 39–40°. J. BISHOP TINGLE.

Composition of Tannin. WILHELM STEINKOPF AND JOHANN SARGARIAN. Chem. Inst. Techn. Hochsch., Karlsruhe. *Ber.*, **44**, 2904–6.—Six specimens of tannin, of varying origin have been analyzed. They were purified by different methods. The extremes found were C 52.53, H 3.72–3.83; C 52.87, H 3.85; C 52.64, H 3.88–3.92%. J. BISHOP TINGLE.

Ultimate Analysis (KURTENACKER). 7. Theory of Tetrahedral Carbon (PEREIRA). 2.

GRAEBE, C.: **Untersuchungen über Chinone.** Leipzig: 8°, 672 pp., 10 M.

NEAVE, G. B. AND HEILBRON, I. M.: **The Identification of Organic Compounds.** London: Constable & Co., 4s.

STEINKOPF, W.: **Beiträge zur Kenntnis des Einflusses negativer Atome und Atromgruppen bei Derivaten des Acetonitrils und Acetamids.** Karlsruhe: 8°, 116 pp., 2.80 M.

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11. BIOLOGICAL CHEMISTRY.

WILLIAM. J. GIES.

A. GENERAL.

FRANK P. UNDERHILL.

The Instability of Glucose at the Temperature and Alkalinity of the Body. LAWRENCE J. HENDERSON. Biochem. Lab., Harvard Med. Sch. *J. Biol. Chem.*, **10**, 3–7.—Glucose, arabinose, fructose and galactose, when b. in an aq. soln. of Na_2HPO_4 and NaH_2PO_4, having about the neutrality of the tissue fluids, show diminished optical activity, and may lose such activity entirely. When kept at body temp., even for a month or more, the loss in rotation is slight (4%). S. R. BENEDICT.

The Partial Hydrolysis of Proteins. III. Fibrin Protoalbumose. P. A. LEVENE, D. D. VAN SLYKE AND F. J. BIRCHARD. Rockefeller Inst. Med. Research, N. Y. *J. Biol. Chem.*, **10**, 57–71.—Detailed analyses of the hydrolytic products of hetero- and protoalbumoses are reported. Heteroalbumose yields 9.51% of glutaminic acid, while protoalbumose yields only 0.63% of this acid. Significant differences, though not quite so great, also occur in the quantities of leucine, isoleucine and valine yielded by the two albumoses. S. R. BENEDICT.

Oxidation of the Amino Acids. II. Alanine and Tyrosine. W. DENIS. Physiol. Lab., Tulane Med. School. *J. Biol. Chem.*, **10**, 73–6.—Alanine, when oxidized with alk. $KMnO_4$, yields NH_3, CO_2, $H_2C_2O_4$, HOAc, and HNO_2. Tyrosine, when similarly oxidized, yields the same products, together with traces of an acid thought to be *p*-oxybenzoic acid. S. R. BENEDICT.

Sulfur Linkages in Proteins. TREAT B. JOHNSON. Sheffield Lab., Yale Univ. *J. Biol. Chem.*, **9**, 439–48.—A theoretical discussion in which it is concluded that proteins probably contain other S combinations than cystine. S. R. BENEDICT.

The Amino Acids in the Mature Human Placenta. ARTHUR H. KOELKER AND J. MORRIS SLEMONS. Johns Hopkins Hospt. *J. Biol. Chem.*, **9**, 471–89.—About ½ of the fresh placenta is blood. The dried placenta material is about 7% of the gross wt. of the organ. The hydrolytic products represent at least 31% of the organic matter. Dry and ash-free placental tissue contains 14.9% N. A table of the amino acids isolated after hydrolysis of the placenta is given. S. R. BENEDICT.

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Christian A. Herter. OWEN T. WILLIAMS. *Biochem. J.*, 5, 21–30.—Obituary.
F. J. BIRCHARD.

The Heat of Combustion of Compounds of Physiological Importance. A. G. EMERY AND F. G. BENEDICT. Nutrition Lab., Carnegie Inst. of Washington, Boston. *Am. J. Physiol.*, 28, 301–7.—Heats of combustion detd. in the adiabatic calorimeter gave the following values in cal. per g.: Dextrose 3739, levulose 3729, lactose 3737, maltose 3776, glycogen 4227, alanine 4401, allantoin 2584, asparagine 3065, aspartic acid 2882, creatine 4240, creatinine 4986, cystine 4137, glutaminic acid 3662, glycocol 3110, hippuric acid, 5660, tyrosine 5915, urea 2528, uric acid 2737, acetone 7429, alc. 7104, β-oxybutyric acid 4693, lactic acid 3615, glycerol 4323, palmitic acid 9318, stearic acid 9499, oleic acid 9423. J. F. LYMAN.

Caseifying Action of Certain Lipoids. H. GAEHLINGER AND A. TILMANT. *Compt. rend. soc. biol.*, 71, 345–6.—There exists in lipoids, particularly in hepatic lipoids, acid-resistant, fat acids capable of causing caseification in a manner similar to the ether-bacilline of Auclair, the caseifying poison of tubercle bacilli. I. K. PHELPS.

Are the Oxidation Processes the Independent Variable in the Processes of Life? JACQUES LOEB AND HARDOLPH WASTENEYS. Rockefeller Inst., New York. *Biochem. Z.*, 36, 345–56.—The temp. coeffs. of the O consumption and the segmentation of Arbacia eggs at varying temps. was detd. The oxidation coeff. for temps. from 3–13° to 20–30° remained at 2 or slightly more than 2, the value characteristic for chem. reactions in general. The segmentation coeff., however, was normal only between 15–25° and 20–30°. At lower temps. it became higher, being 6 for 7–17°. Below 7° the eggs do not segment. Unfertilized eggs, and eggs in which development is prevented by the presence of a sufficient conc. of NaCN show only a little over 1/4 the O consumption of developing eggs. These facts can be harmonized by assuming that the oxidation processes in the fertilized egg are the summation of 2 really distinct processes, one of which proceeds in the unfertilized egg and in the egg in which segmentation is prevented by NaCN or cold, while the other process is characteristic of the developing fertilized egg, and is responsible for about 3/4 of the O consumption in the latter. D. D. V. S.

A Case of Mummification. STOECKLIN, VILLEPOIX AND F. PANCIER. *Bull. sci. pharmacolog.*, 18, 140–5.—After exam. of a mummy found in Amiens, the authors conclude that the body was mummified under natural conditions, the process being probably favored by a dry, confined atm. and a mean temp. of 15–19°.
V. K. CHESNUT.

Homocholine and Neosine (BERLIN). 10. Synthesis of δ-Guanidinovaleric Acid (ACKERMAN). 10. Surface Electric Charges in Living Cells (HARDY, HARVEY). 2. Properties of Colloidal Systems (BAYLISS). 2.

BECHHOLD, H.: **Die Kolloide in der Biologie und Medicin.** Dresden: T. Steinkopff, 15.50 M.

CUMMING, A. C.: **Practical Chemistry for Medical Students.** Edinburgh, J. Thin.

B. METHODS AND APPARATUS.

S. R. BENEDICT.

The Digestibility of White of Egg as Influenced by the Temperature at which it is Coagulated. PHILIP FRANK. Physiol. Lab., Tulane Univ. *J. Biol. Chem.*, 9, 463–70.—Peptic digestion of egg-white in Mett tubes is more rapid when the albumin is not heated above 75° during the coagulation. In standardizing enzymes by Mett's method, the temp. at which coagulation was effected must be taken into account.
S. R. BENEDICT.

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A Method for the Study of Proteolytic Ferments. PHILIP A. KOBER. Research Lab., Roosevelt Hospt., N. Y. *J. Biol. Chem.*, 10, 9–14.—Most, or all amino acids form Cu salts which yield their Cu as $Cu(OH)_2$ when boiled with a slight excess of alkali. Most of the polypeptides which form Cu salts do not lose the Cu under similar treatment, nor do the peptones, which dissolve more $Cu(OH)_2$ in presence of alkali than in its absence. It is proposed to base a method for the study of ferment action upon the above facts. S. R. BENEDICT.

The Analysis of Proteins by Determination of the Chemical Groups Characteristic of the Different Amino Acids. DONALD D. VAN SLYKE. Rockefeller Inst. Med. Research, N. Y. *J. Biol. Chem.*, 10, 15–55; see *C. A.*, 5, 1938, 3295. S. R. B.

The Application of the Optical Method to a Study of the Enzymatic Decomposition of Nucleic Acids. SAMUEL AMBERG AND WALTER JONES. Physiol. Chem. Lab., Johns Hopkins Univ. *J. Biol. Chem.*, 10, 81–7.—Pighini (*C. A.*, 5, 1290) reported that when yeast nucleic acid is digested with blood serum at body temp., the optical rotation falls markedly, and believed that this diminution in rotation was due to a complete disruption of the nucleic acid. In the present work it is reported that thymus nucleic acid is not affected (in its rotatory power) by digestion with the blood serum of dog, ox or rabbit. The fall in optical activity observed after digestion of yeast nucleic acid with serum, is not accompanied by liberation of purines or of H_3PO_4. Slight temp. changes cause marked differences in the rotation exhibited by solns. of nucleic acids, and where the optical method is employed in a study of enzyme action on these substances, the temp. factor must be exactly controlled. S. R. B.

The Determination of Iodine in Thyroid. ATHERTON SEIDELL. U. S. Hygienic Lab., Washington, D. C. *J. Biol. Chem.*, 10, 95–108.—Hunter's method for the detn. of I in thyroid is said to be more accurate than that of Baumann or Riggs. Numerous detns. of I in dog and sheep thyroids are reported. S. R. B.

The Determination of Calcium in the Presence of Magnesium and Phosphates: The Determination of Calcium in Urin. FRANCIS H. MCCRUDDEN. Hospt. Rockefeller Inst. for Med. Research, N. Y. *J. Biol. Chem.*, 10, 187–99.—Detailed directions are given for carrying out the usual pptn. of Ca as CaC_2O_4 in urin. S. R. B.

An Improved Apparatus for the Determination of Amino Acids. DAVID KLEIN. Chem. Dept., Univ. Wis. *J. Biol. Chem.*, 10, 287–9.—The app. described is offered as an improvement over that proposed by Van Slyke for detg. amino N by measuring the N liberated by reaction with HNO_2. S. R. B.

A Note on Shaffer's Method for the Determination of β-Hydroxybutyric Acid. ROBERT A. COOKE AND E. E. GORSLINE. Lab. of Chem. Path., Cornell Med. Sch., N. Y. *J. Biol. Chem.*, 10, 291–4.—The procedure recommended for detg. β-hydroxybutyric acid in urin is as follows: 25–250 cc. of urin are measured into a glass stoppered graduate. An excess of basic $Pb(OAc)_2$ is added and 10 to 20 cc. of conc. NH_4OH. After dilg. to 500 cc. the mixt. is shaken and filtered. 300 cc. of the filtrate in a 500 cc. glass-stoppered graduate are neutralized with conc. H_2SO_4, made up to 500 cc. and filtered. An aliquot part of this filtrate (usually about 200 cc.) is placed in an 800 cc. Kjeldahl flask, 15 cc. conc. H_2SO_4, a little talcum, and H_2O to 500 cc. are added and the mixt. distilled, about 250 cc. of distillate being collected. This distillate contains volatil acids and acetone. The acids are removed by distilling after addition of NaOH, and the acetone titrated with standard I and $Na_2S_2O_3$. The residue in the 1st distillation flask is dild. to 600 cc. and 5 cc. of 5% $K_2Cr_2O_7$ soln. added, and the mixt. distilled down to 300 cc. More $K_2Cr_2O_7$ soln. is added if the mixt. turns green in color. H_2O is added through a dropping funnel to make 500 cc. and the distillation continued down to 300 cc. again. The 500 cc. of distillate thus obtained is redistilled

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after addition of 20 cc. of 3% H_2O_2 and 10 cc. of 10% NaOH soln. The distillate thus obtained is titrated with standard I and $Na_2S_2O_3$ as above. The result indicates hydroxybutyric acid as acetone. Results reported indicate that the method yields very satisfactory results. S. R. B.

The Cause of the Sugar Test in Urin Described by L. DeJager. L. DEJAGER. Leeuwarden, Holland. *Zentr. ges. Physiol. Path. Stoffw.*, 4, 713–6; cf. *C. A.*, 5, 3691.—The red-colored substance contains Cu and is very unstable, losing its red color on standing in the air. NaOH changes the color to blue, while in NH_4OH, the color disappears. With alc., it remains red for a time, then turns blue. It gives 2 absorption bands between 600–580 and 510–480. It is sol. in ether, $CHCl_3$ and $C_2H_{11}OH$; insol. in HCl or H_2SO_4. NaOH gives a yellow soln. Neither H_2S, NaOH or NH_4OH indicates the presence of Cu. $K_4Fe(CN)_6$ gives a red ppt. After decomp. with HNO_3, Cu is indicated by NH_4OH. To produce it, glucose, $CuSO_4$, NaOH or $Ca(OH)_2$ and urin or a substance contained in Liebig's ext. of beef (probably creatinine) are necessary. DeJ. prepared it from urin and glucose. It gives an orange-red color with Weyl's creatinine reagent and a red ppt. of Cu when boiled with glacial AcOH. Boiling with HNO_3 produces a yellow soln. B. with NaOH or $Ca(OH)_2$ liberates NH_3. It is sol. in abs. alc. The probable reaction is: $CuSO_4$ combines with creatinine (or some other substance) in alk. soln., glucose is decomposed by the alkali-forming humin substances which yield with the Cu compd. the second or red-colored compd. and metallic Cu. There must be more Cu than is required to react with the glucose.

C. A. BRAUTLECHT.

Potassium Thiocyanate Media for the Differentiation of B. diphtheriae and Associated Organisms. MYER COPLANS. *J. Path. Bact.*, 16, 130–1.—In a broth and sheep serum medium containing glucose, KCNS, $CaCl_2$ and aq. neutral red, *B. diphtheriae* develops a bluish pink with diffusion through the medium, *B. hoffmani* diffusion of a yellowish tint, and *Staphylococci* a local raised straw-colored colony. In the absence of a pinkish tint by the 18th hr. the absence of *B. diphtheriae* is certain. J. H. M.

A Method of Qualitative Analysis of Tissue Lipoids, with a Preliminary Note on Degeneration in the Brain. J. L. SMITH AND W. MUIR. *J. Path. Bact.*, 16, 131–5.—The chief point of the method is that it succeeds in saponifying the fat and lecithin, leaving the cerebrosides relatively unaffected. The fat is extracted with $CHCl_3$ and the acidity titrated. It is then saponified with baryta, and extracted with acetone. Upon standing, the cerebrosides settle out. The supernatant fluid is decanted, evapd., the residue dissolved in hot C_2H_5OH, and a part of this is detd. for cholesterol by the digitonin method. In another portion P is estd. by a modification of the Neumann method. J. H. MITCHELL.

Osmotic Pressure of Milk as Determined by a Hematocrit. S. MUNDULA. Physiol. Inst. Sassari. *Arch. ital. biol.*, 52, 223–35; through *Zentr. Biochem. Biophys.*, 11, 728–9.—The method is claimed to be peculiarly advantageous since it is very exact and uses very small vols., thus allowing a study of the mol. concs. of the milk and the blood from the same individuals. These fluids were found to be isotonic in women, as has already been found by the cryoscopic method to be the case in several species of animals. I. K. P.

A Modification of Wohlgemuth's Method for the Quantitative Study of the Activity of the Pancreatic Function. P. B. HAWK. Lab. of Physiol. Chem., Univ. of Ill. *Arch. Intern. Med.*, 8, 552–6.—To avoid errors in the detn. of the amylolytic acitivity of the stools, due to variations in the acidity, H. suggests the use of a phosphate mixt. as the extraction medium. This mixt. contains 0.1 mol. NaH_2PO_4 and 0.2 mol. Na_2HPO_4 per l. It is prepared in a 1% soln. of NaCl. By the use of this phosphate mixt., a

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neutral ext. is secured even though the feces possess a rather high H^+ or OH^- conc.
W. C. Rose.

The Excretion of Quinine by the Dog. A New Method for Quantitative Determination of Quinine. Julius Katz. Pharm. Inst., Univ. Berlin. *Biochem. Z.*, 36, 144–89.—Regarding all previous methods as unsatisfactory, K. has devized the following for the detn. of quinine in urin: In 400 cc. of filtered urin are dissolved 10 cc. of 30% AcOH and, with warming, 200 g. of $(NH_4)_2SO_4$, the purpose of the latter being to assist in the subsequent extraction of the quinine. The cooled soln. is transferred without filtering to a separatory funnel and made alk. with 20–25 cc. of 10% NH_4OH. It is then shaken out 3 times with a mixt. of 1 part $CHCl_3$ and 3 parts ether, 150 cc. of this mixt. being used for the first extraction, 50 cc. for each of the others. The ext. is decolorized by shaking with MgO powder, filtered, and conc. to dryness. The residue is redissolved in 10 cc. of 10% H_2SO_4, filtered, made alk. with NaOH and again extracted 3 times with $CHCl_3$-ether. The ext. is again decolorized with MgO, conc. to about 1 cc. and washed with alc. into an evapg. dish. Ten drops conc. HCl and 20 drops 25% NaCl are added and the soln. evapd. to dryness. The NaCl prevents the quinine from retaining more than the theoretical amt. of HCl. The quinine-HCl and insol. NaCl are transferred with 25 cc. alc. to a flask and 5 drops of Poirrier's blue are added. The HCl of the quinine-HCl is then titrated with an 0.1 *N* soln. of KOH freshly made by diluting 10 cc. of *N* KOH to 100 cc. with alc. The end reaction is sharp only when the titration is done in alc. soln. One cc. 0.1 *N* KOH = 0.0162 g. quinine. Control analyses on urin gave 98–100% of the theoretical results. In order to det. quinine in feces, the latter are extracted with alc., the alc. evapd., and the residue taken up with H_2O and treated as the urin. Dogs were given intravenously, intramuscularly, or *per os* in capsules, 0.4–1.0 g. quinine per day. A portion was always excreted in the urin, at the most 12%. The highest excretion occurred after administering quinine *per os*, the next after subcutaneous injection, and the lowest after intramuscular injection. On the 4th day after administration of the drug was discontinued it disappeared from the urin and apparently from the body. After administration of aristochin, a tasteless deriv. of quinine, the excretion of quinine set in more slowly and continued longer than after quinine itself was given. When quinine was fed, a portion was recovered unabsorbed from the feces. Large intramuscular or intravenous injections of quinine caused vomiting, so it appears probable that quinine, like morphine, can be partially excreted into the stomach. The injections cause no suppuration if the alkaloid is neutralized with formic acid, or the animal is treated with urethane.
D. D. Van Slyke.

The Effect of Cooling on the Schardinger Reaction of Milk. R. Burri and H. Schmid. Schweiz. Milchwirtsch. u. Bakt. Versuchsanstalt, Bern-Liebfeld. *Biochem. Z.*, 36, 376–88.—If milk is cooled to 10° or lower and afterwards tested for the Schardinger reaction (catalysis of the reduction of methylene blue by HCHO), the time required for the reduction is diminished to about $^2/_3$ that required with the uncooled milk. When milk has been cooled for less than an hr. the effect of the cooling is partially reversible, and can be reduced by warming the milk before trying the reaction. After longer periods of cooling the effect becomes irreversible. The reductase is attached to the fat globules, from which it becomes freed when the globules solidify. When the globules remain frozen for an hr. or more a secondary change in their structure occurs, accompanied perhaps by crystn., which is evidenced by the fact that the action of the cooling on the reductase then becomes irreversible. D. D. V. S.

Determination of Casein in Milk (Halphen). 12. Detection of Carbon Monoxide by Blood (Franzen, Mayer). 7.

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C. BACTERIOLOGY.

ERNEST D. CLARK.

The Phosphorus Assimilation of Aspergillus niger. ARTHUR W. DOX. Chem. Lab., Iowa Agr. Exp. Sta. *J. Biol. Chem.*, 10, 77–80.—It is reported *Aspergillus niger* can utilize the P in a number of substances (phytin, Na nucleinate, Na glycerophosphate, lecithin, casein, Na_2HPO_4, $Na_4P_2O_7$, $NaPO_3$) as a source of this element, but compds. of trivalent P, although not toxic, cannot supply the P needs of the organism. S. R. BENEDICT.

The Erepsins of Glomerella rufomaculans and Sphaeropsis malorum. H. S. REED AND H. S. STAHL. Virginia Agr. Exp. Sta. *J. Biol. Chem.*, 10, 109–12.—These parasitic fungi contain ereptic enzymes capable of yielding tryptophane when grown in solns. containing peptone. S. R. B.

Nitrogen Fixation by Yeasts and other Fungi. CHARLES B. LIPMAN. Lab. for Soil. Chem. and Bacteriology, Univ. of Cal. *J. Biol. Chem.*, 10, 169–82.—Nearly all of 18 organisms tested, including yeasts, pseudo-yeasts and molds, showed power of N fixation, which action takes place best in tap-water solns. containing dextrose. S. R. B.

Phytase in Lower Fungi. ARTHUR W. DOX AND ROSS GOLDEN. Iowa Agr. Exp. Sta. *J. Biol. Chem.*, 10, 183–6.—The 3 species of *Aspergillus* investigated showed a phytin splitting power, which was most marked in *Aspergillus niger*. In all cases the enzyme is present in both the intra and extra-cellular form. S. R. B.

A Study of the Optical Forms of Lactic Acid Produced by Pure Cultures of Bacillus bulgaricus. JAMES N. CURRIE. Agr. Chem. Lab., Univ. Wis. *J. Biol. Chem.*, 13, 201–11.—Some strains of *B. bulgaricus* may be differentiated by the optical activity of the lactic acid which they produce. Certain strains of the organism also produce small amts. of succinic acid. S. R. B.

A Biochemical Study of Proteus vulgaris, Hauser. C. A HERTER AND CARL T. BROECK. Herter Lab., 819 Madison Ave., N. Y. *J. Biol. Chem.*, 9, 491–511.—*Proteus vulgaris* will ferment dextrose and saccharose, but not lactose. In the absence of carbohydrates the oganism destroys some native albumins, yielding NH_3, primary amines, H_2S, fatty acids of a high mol. wt., aromatic oxy-acids, indole, and indol-AcOH. *Proteus vulgaris* possesses the properties of both fermentative and putrefactive organisms. The body of the bacteria, pptd. by alc. contains a toxic substance which is thermostable. S. R. B.

The Disinfective Action of Iodoform and Novoiodin. MAX EUGLING. Hyg. Inst. der k. k. Univ. in Wien. *Centr. Bakt. Parasitenk., I Abt.*, 60, 397–416.—The new antiseptic, novoiodin, has a greater disinfectant power and growth-inhibiting power than CHI_3, airol, xeroform or vioform. Staphylococcus killed by airol (second in disinfecting power) 1 : 100 in 3 hrs. were killed in 5 min. by novoiodin (1 : 1,000). Novoiodin has a general effect besides its local action and free I is split off; the activity of the formaldehyde could not be ascertained. A liberation of I from CHI_3 by reducing bacteria could not be demonstrated. Novoiodin sterilizes pus whereas CHI_3 does not. Anthrax threads treated with novoiodin and implanted under the skin of white mice were without reaction, while those treated with CHI_3 caused death in the mice in 3 days; indifferent materials were just as active as CHI_3. A specific action of CHI_3 upon tubercle bacilli could not be ascertained, while guinea pigs receiving tuberculous sputum treated with novoiodin subcutaneously were still alive and well after several months. H. J. CORPER.

The Destruction of Bacteria by the Heavy Metals and Building Materials. LUDWIG BITTER. Hyg. Inst. in Kiel. *Z. Hyg.*, 69, 483–512.—The following metals have

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antagonistic properties toward bacteria drying on them and in the following order: Cu, brass, Ag, Au, Pt, Pb, cast iron, steel, Al, Ni, Zn, Sn. The death of the bacteria is accelerated by moistening, but the medium, water, bouillon, or urin, made no difference. The disinfection intensity was alike whether the metal was polished, or dirty and oxidized. While walls and floors have strong bacteria-destroying properties attributable to the linseed oil used and which disappears in a short time, linoleum shows a lasting bactericidal property. On polished furniture, *B. typhosus* lives a shorter time than on unpolished. All glasses examined and clean quartz have a definit bactericidal character. Polishing, treating, etc., of woods, aside from the smoothness obtained, does not give it any lasting bactericidal properties. Anthrax spores dried on silk threads under the influence of weather and climate retain their virulence and life for 28 years. In dry soil *B. typhosus*, *B. paratyphosus* and *B. coli* are destroyed in 8 days, *Staph. aureus* not even in 60 days. In moist soil the above-named organisms are still alive at the end of 60 days. H. J. C.

The Nature of Gram Staining. C. Dreyer, S. A. Scott and W. A. Walker. *J. Path. Bact.*, 16, 146.—Treatment of *B. coli* with a fine emulsion of lecithin in H_2O leads in some cases to a Gram-positive reaction. Prolonged extraction of staphylococci with hot ether renders them almost entirely Gram-negative. The ether ext. of these organisms emulsified in H_2O was applied to *B. coli* which then became positive in many cases. The ether ext., when dried upon a slide, takes up methyl violet with avidity, as does lecithin, but loses it after treatment with I in KI soln. and alc. J. H. M.

Disinfecting Action of Cations According to the Law of the Periodic System. V. Lusini. Univ. Siena. *R. accad. fisiocrit.*, March 20, 1910; through *Zentr. Biochem. Biophys.*, 11, 960.—Although the disinfecting action of cations is not in direct relationship to at. wt., the greatest disinfecting action belongs to the heavy at. wt. With few exceptions the disinfecting action increases with the chem. affinity of the combined elements. The alkali group has a lower disinfecting power than those of the alk. earth group. This last mentioned group is an exception to the generalizations given above, having disinfecting power in inverse ratio to at. wt. Among the other elements of the periodic system, Fe has a low power corresponding to its low at. wt.; Sn has a somewhat higher power, and Pb a still higher power. I. K. Phelps.

An Intermediary Product of Alcoholic Fermentation. H. Euler and A. Fodor. Stockholm. *Biochem. Z.*, 36, 400–10.—140 g. of cane sugar were dissolved with 27 g. NaH_2PO_4 and 52 g. Na_2HPO_4 in 660 cc. of water and fermented with yeast. The H_3PO_4 ester of a triose, apparently, was pptd. with $Cu(OAc)_2$, transformed into the KH salt and pptd. with alc. The substance (an oil, yield 13 g.) gave analytical figures for $C_3H_7O_3PO_4KH$. The dissociation of the ester salt was calc. from the cond., and the mol. wt. was 256, calc. 226. Further evidence that the substance was the mono-ester of a triose rather than the isomeric di-ester of a hexose was afforded by the hydrolysis, which was performed with 2% H_2SO_4. No hexose could be obtained, but CH_2O was detected among the decomp. products. In addition to the triose ester, a hexose ester was isolated as the Ph hydrazine deriv., the substance corresponding in properties to that found by Lebedev, and by Harden and Young.

D. D. Van Slyke.

The Formation of the Plasma Protein in Yeasts and Molds. Felix Ehrlich. Landw.-techn. Inst., Univ. Breslau. *Biochem. Z.*, 36, 477–97.—Previous work by E. has shown that yeast is capable of developing on a medium containing only mineral salts, sugar and an amino acid. The amino acid is deaminized and only the NH_2 from it is used by the yeast in protein synthesis. The remainder of the amino acid mol. is rejected in the form of the corresponding alc. or fatty acid. The sugar is the sole source of C for the construction of the yeast proteins. To find which of the sugar

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decomp. products may be utilized to build up the complex radicles found in the protein mol., E. grew a pure culture of a wild yeast, *Willia anomola*, Hansen, on solns. containing only mineral salts, tyrosine, and either, glycerol, EtOH, MeOH, amyl alc., or lactic acid. The cultures in glycerol and EtOH grew as well as the control in sucrose, and the cells at the end of 2 mos. contained about as much N. A large part of the tyrosine was regained as tyrosol. The cultures in lactic acid, MeOH and amyl alc. grew slightly and formed sufficient tyrosol for isolation. The fact that tyrosol corresponding to practically all of the tyrosine was regained from the EtOH and glycerol cultures shows that even when the C diet is limited to such simple compds. as these the yeast does not utilize the C of the amino acids. *Oidium lactis* was found to utilize lactic acid as well as glycerol and MeOH. Both the wild yeast and a cultivated beer yeast appreciably on a soln. containing only mineral salts, tyrosine and pyrotartaric acid and formed detectable amts. of tyrosol. D. D. Van Slyke.

Nitrogen Binding and Denitrification (Felsinger). 15.

D. BOTANY.

CARL L. ALSBERG.

The Chemical Differentiation of Species. Muriel Wheldale. Cambridge. *Biochem. J.*, 5, 445–56.—Following a discussion of the conception of a chem. basis of vegetable structure, an account of the distribution of a few of the various classes of organic compds. (phenols, aromatic alcs., aldehydes, acids, proteins, the mustard oils, cyanogenetic compds. and alkaloids) is given. F. J. Birchard.

Physiological Behavior of Enzymes and Carbohydrate Transformations in After-ripening of the Potato Tuber. Chas. Appleman. *Bot. Gaz.*, 52, 306–15.—On account of errors introduced by inclusion of the peroxidase in the clot of coagulated proteins and the loss of peroxidase during the drying of the material, the method of Grüss for detg. peroxidase activity gives no indication of the conditions existing in the living tuber. During storage at low temp. the increase of sucrose is more rapid at first than that of glucose, but at the end of 6 weeks the amt. of the latter is about twice that of the former. In low temp. storage diastase activity increases, which is probably due to the greater activation of the zymogen by free acids which are liberated as a result of the greater permeability of the plasma membrane at low temp. Catalase is abundant in tubers stored at 20–25° or at 0° but suffers a gradual reduction as storage at 0° continues. H. A. Spoehr.

A Glucoside in Pear Leaves. E. Bourquelot and A. Fichtenholz. *Compt. rend.*, 153, 468–71; cf. *C. A.*, 5, 1297.—Arbutin was found in various species of wild pear and the pure substance was isolated from the leaf. Branch tips collected in Nov. showed the presence of arbutin, while the bark of branches and of roots collected in June showed a much lower reduction number when hydrolyzed with emulsin. H. A. S.

The Nourishment of Green Plants with Formaldehyde and Formaldehyde-generating Substances. Th. Bokorny. *Biochem. Z.*, 36, 83–97.—Green plants can form starch from CH_2O, but the latter must be present only in extremely dil. soln., because of its toxicity. *Spirogyra* in a soln. containing mineral salts and 0.001% CH_2O formed in 9 days large amts. of starch, while the controls formed none. Watercress contained in a CO_2-free enclosure, the atm. of which was permeated with the small amt. of CH_2O evapg. from a 0.1% soln., synthesized considerable amts. of starch and lived much longer than control seedlings in absence of CH_2O. Methylal, which readily decomposes into CH_2O and MeOH, furnished, in 0.1% soln., material to *Spyrogyra* for synthesis of starch, the formation of which in the chlorophyll body was followed by the I reaction. The compd. formed by CH_2O with $NaHSO_3$, which readily decomposes into its original

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components, also furnishes algae with C for starch assimilation. The above results support Baeyer's view that carbohydrates are formed in plants by polymerization of CH_2O. Expts. with MeOH in 0.5% soln. show that it can serve as nutrient to bean and pea seedlings. Solns. of malic acid, lactic acid and antipyrin of 0.5% conc. act injuriously on bean seedlings. D. D. VAN SLYKE.

E. NUTRITION.

PHILIP B. HAWK.

NORMAL.

Experimental Studies on Creatine and Creatinine Metabolism. I. The Role of the Carbohydrates in Creatine-Creatinine Metabolism. LAFAYETTE B. MENDEL AND WILLIAM C. ROSE. Sheffield Lab. of Physiol. Chem., Yale Univ. *J. Biol. Chem.*, 10, 213–51.—An extended theoretical and experimental discussion. In starving rabbits the creatine can be caused to entirely disappear from the urin by liberal feeding with pure carbohydrates. In such animals the creatine elimination is not reduced by a diet of fat or of fat and protein. Experimental interference with carbohydrate metabolism (poisoning with P or with phlorhizin) leads to an increased output of creatine in dogs. An increase in total creatinine elimination is always accompanied by an increase in total N output. This parallelism of total creatinine and total N elimination is ascribed to a common source, *viz.*, true tissue, or endogenous metabolism. The metabolism of exogenous or reserve protein is not accompanied by production of creatine or creatinine. The paper contains an interesting and detailed discussion of the relation between carbohydrate and creatine metabolism and a summary of the literature. **II. Inanition and the Creatine Content of Muscle.** *Ibid.*, 255–64.—A marked increase in the % of creatine in the muscles of fowl and rabbits occurs during inanition. This increase is believed to be due rather to increased creatine formation, than to a removal of the non-creatine portion of the muscles. **III. Excretion of Creatine in Infancy and Childhood.** WILLIAM C. ROSE. *Ibid.*, 265–70; see *C. A.*, 5, 3602. S. R. B.

Lecithin Metabolism. A. BICKEL. Path. Inst., Univ. Berlin. *Intern. Beitr. Path. Thérap.*, 3, 171–9.—Com. lecithin preps. (biocitin and ovolecithin) were fed to a man, the N and P balance being detd. The results showed that lecithin P was reabsorbed and deposited; cf. following abstr. C. A. BRAUTLECHT.

Influence of Lecithin upon Calcium and Magnesium Excretion. A. LOEB. Path. Inst., Univ. Berlin. *Intern. Beitr. Path. Thérap.*, 3, 235–7.—Expts. on man indicated that P_2O_5 retention, produced by feeding lecithin, was not accompanied by a Ca and Mg retention. There was thus no addition to inorganic bone substance; cf. preceding abstr. C. A. B.

The Progress of the Past Three Years in the Study of Salt Metabolism of Infants. E. SCHLOSS. *Jahrb. Kinderheilk.*, 74, 91–106.—Discussion and bibliography. M. S. FINE.

Influence of Saliva in the First Stages of Digestion in Infants. G. B. ALLARIA. Med. Klinik Kgl., Univ. Turin. *Jahrb. Kinderheilk.*, 74, 252–73.—A. compared physical and physico-chem. properties of saliva, milk, contents of mouth during feeding and stomach contents immediately after feeding. The following detns. were made: Depression of f. p., elec. cond., sp. gr., viscosity, surface tension, Cl and conc. of H ion. The saliva was obtained by app. devized by the author (*La Pediatria*, No. 12, 1910). M. S. F.

Physiology of the New-born Child. W. BIRK. Kaiserin-Auguste-Viktoria-Haus. *Monatsschr. Kinderheilk.*, 9, 595; through *Zentr. Biochem. Biophys.*, 12, 5.—The metabolism of 3 newly born infants was compared, 1 of the 3 being fed on woman's milk at the height of lactation. The colostrum was found to contain more P and Na than

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milk and especially more N. Both infants fed on colostrum showed a positive N balance although one lost in total wt. past the fifth day when the other ceased to lose wt. The child fed on milk had a negative N balance. In the ash balance the child fed on milk showed a negative balance in P, K and Mg; the colostrum-fed infants had a good retention of these constituents. Two other infants fed on cow's milk dild. $^1/_2$ with 5% milk sugar soln. showed in one case a negative N balance, in the other an insufficient positive N balance. In both infants the N in the urin was high. About 0.5 of all N fed appeared in the urin; in normally nourished infants not more than $^1/_6$ is found. The ash balance in the first case was positive, in the second negative, due, probably, to incomplete assimilation. I. K. PHELPS.

Studies on Water-drinking. VI. The Activity of the Pancreatic Function under the Influence of Copious and Moderate Water-drinking with Meals. P. B. HAWK. Lab. of Physiol. Chem., Univ. of Ill. *Arch. Intern. Med.*, 8, 382–94.—Basing his conclusions on the amylolytic activity of the feces estd. according to the procedure of Wohlgemuth, H. affirms that the ingestion of quantities of H_2O at meal-time ranging in vol. from $^1/_2$ to 1 $^1/_2$ l., stimulates the pancreatic function in 2 ways; (1) A direct stimulation of the nervous mechanism of the pancreas, brought about while the H_2O is still in the stomach; and (2) an indirect stimulation brought about by the entrance of the increased vol. of acid chyme into the duodenum. W. C. ROSE.

Are Starch Granules Excreted through the Kidneys? J. VOIGT. Pharm. Inst., Univ. Göttingen. *Biochem. Z.*, 36, 397–400.—V. collected by catheter the urin of a woman fed with food containing a large amt. of unbroken starch granules, precautions being taken that the urin should not become contaminated with granules from the air or surroundings. The urin was examd. for starch granules with uniformly negative results. V. believes that starch granules found by previous investigators in urin were accidental contaminations. D. D. VAN SLYKE.

Experiments on the Influence of Muscular Exercize upon the Elimination of Alcohol through the Lungs and in the Urin. W. VOELTZ. *Z. Spiritusind.*, 34, 485–99.—Although a considerably larger amount of alc. was eliminated as a result of muscular labor amounting to about 3.18 times the value for an equal period in the state of rest, a much larger % of the alc. was also utilized in the system during muscular exertion. In a state of rest an average of 3.03% and during muscular exertion 9.5% were eliminated. C. A. NOWAK.

Phosphoric Acid Metabolism. BERG. Losschwitz. *Chem. Ztg.*, 34, 1049.—The inorganic anions (H_3PO_4, H_2SO_4, etc.) are not available to the human organism as such, but do serve as irritants. As such they are removed from the body as rapidly as possible, and in the process rob the body, in their neutralization of its reserve supply of cations, especially Ca. The Ca phosphates are mostly eliminated as $Ca_3(PO_4)_2$ through the large intestin by which acid phosphates carry Ca out of the organism. The officinal dicalcium phosphate instead of supplying Ca carries it away. Ca hypophosphite leaves $^2/_3$ of its Ca in the organism, under certain conditions and gradually causes an acidosis which may become dangerous in rachitis, etc. As a means of supplying P it is valueless. For an increased urin secretion or peristalsis $CaSO_4$ or $CaCl_2$ are used but these leave part of their Ca in the organism and rob it of Na or K. If the latter is not desired the salt of an easily oxidized acid such as Ca lactate is used and a rapid deposition of Ca is produced at the same time; otherwise under ordinary circumstances cooked vegetables are the best Ca prep. $CaCO_3$ is only effective to the degree to which it is converted into $CaCl_2$ by the stomach juices. The acid carbonate is absorbed as such to some extent at least. Lecithin is not a "nerve-building material" because it is decomposed in digestion; likewise phytin. All

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inorganic "nutrient salts" are valueless as building materials but may be of some value as irritants. E. J. WITZEMANN.

ABNORMAL.

Mucic Acid and Intermediary Metabolism. WILLIAM C. ROSE. Sheffield Lab. of Physiol. Chem., Yale Univ. *J. Biol. Chem.*, 10, 123–38.—Mucic acid, in doses of 10–20 g. was partially oxidized by rabbits, and was excreted in part unchanged in the urin. Twenty g. of the acid given to dogs showed the same behavior. Mucic acid does not appear to be a precursor of oxalic acid in the organism, nor is it apparently an intermediary product in the metabolism of galactose-yielding sugars.

S. R. BENEDICT.

Studies in Carbohydrate Metabolism. I. The Influence of Hydrazine upon the Organism, with Special Reference to the Blood Sugar Content. FRANK P. UNDERHILL. Sheffield Lab. of Physiol. Chem., Yale Univ. *J. Biol. Chem.*, 10, 159–68.—100 mg. of hydrazine sulfate per kg. are fatal to dogs and rabbits. In dogs a dose of 50 mg. of hydrazine sulfate per kg. leads to a lowering of the % of sugar in the blood. With rabbits this effect is not const. During a short period of inanition, dextrose assimilation is as good in dogs treated with hydrazine as in normal dogs. Dextrose in doses of 5 g. per kg. causes death when subcutaneously injected into dogs previously treated with non-lethal doses of hydrazine. Hydrazine introduced directly into the blood stream has no appreciable immediate influence upon blood pressure. **II. The Prevention and Inhibition of Pancreatic Diabetes.** FRANK P. UNDERHILL AND MORRIS S. FINE. *Ibid.*, 271–85.—Glycosuria fails to manifest itself after pancreas extirpation in dogs which have received previous injections of hydrazine (50 mg. per kg.). Hydrazine introduced into dogs during pancreatic diabetes is capable of inhibiting the excretion of sugar by the kidney. The blood-sugar content of dogs treated with hydrazine and then depancreatized remains below normal, or at least no hyperglycemia is in evidence. After hydrazine administration the presence of adrenaline can still be demonstrated in the adrenals. In this respect hydrazine differs from P. S. R. B.

Creatine and Creatinine Excretion in Diabetes Mellitus. ROSS TAYLOR. Physiol. Lab., Univ. Glasgow. *Biochem. J.*, 5, 362–77.—Creatine on a creatine-free diet was constantly found in diabetic urin. The creatine is an expression of the increased endogenous protein catabolism due to inability on the part of the tissues to burn sugar. Or it may be due to the non-conversion of creatine into some other substance just as β-hydroxybutyric acid is irregularly converted in certain abnormal states of metabolism. Total creatinine excretion is not abnormally increased in diabetes even when a diet rich in flesh is being ingested. The amt. of creatinine excreted, even on a creatine-creatinine-free diet, varies to a certain extent with the N intake.

F. J. BIRCHARD.

Uric Acid Metabolism in Rabbits. H. ACKROYD. *Biochem. J.*, 5, 442–4.—A. continued his researches (*C. A.*, 5, 551) on the surviving liver of the dog to ascertain whether allantoin was the sole end-product of uric acid metabolism, or whether some portion was changed to urea. The excized liver of the rabbit when perfused with Ringer's soln. produced a small quantity of allantoin. Na urate added to the perfusion liquid is converted quantitatively into allantoin. None of the allantoin so produced is further destroyed. F. J. B.

Complete Metabolism of an Artificially Nourished Infant, Including Respiratory Metabolism. A. NIEMANN. Univ. Kinderklinik, Berlin. *Jahrb. Kinderheilk.*, 74, 22–70, 237–51.—The respiratory chamber is described in detail. The following detns. were made: Dry wt., N and C in food, feces and urin; fat and sugar of food; fat of feces; sp. gr. and vol. of urin; and expired CO_2 and H_2O. In the first expt., lasting 7 days, the infant (16 wks. old) was fed on buttermilk to which was added 50 g. sucrose and

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15 g. flour per l. In the second expt. (6 days) the food consisted of skimmed milk with similar additions of sugar and flour. In both expts. positive C and N balances, but negative H_2O balances were obtained. The third expt., on an infant (36 wks. old), lasted 6 days. Negative C, N and H_2O balances were obtained. M. S. FINE.

Conditions for the Formation of Solid Stools in Infants. K. STOLTE. Univ. Kinderklinik, Strassburg i/Els. *Jahrb. Kinderheilk.*, 74, 367–85.—Discussion. M. S. F.

The Calcium Content of Mother's Milk. A Consideration of the Question of Insufficient Ingestion of Calcium as the Cause of Rachitis. J. A. SCHABAD. Klinik Kinderkrankh. Inst. f. Frauen, Petersburg. *Jahrb. Kinderheilk.*, 74, 511–35.—Usually there is a progressive decrease in Ca conc. during the period of lactation. Average Ca conc. for mother's milk used by healthy and rachitic children are 0.044 and 0.039%, resp. However, rachitis is possible when the milk contains 0.055–0.088% Ca. The Ca conc. of mother's milk cannot be increased by adding Ca comp. to the food. The fat conc. is greater toward the end of lactation than at the beginning. The milk used by rachitic children has a higher fat conc. than that used by healthy children. M. S. F.

Some Energy Factors of the Urin Excreted after Severe Muscular Exercize. H. L. HIGGINS AND F. G. BENEDICT. Nutr. Lab., Carnegie Inst. of Washington, Boston. *Am. J. Physiol.*, 28, 391–400.—Urins from 18 runners collected soon after completing a severe long distance race (25 miles) showed in 12 cases normal C-N and C-cal. ratios; in 6 cases the ratios were abnormally high due probably to a perverted protein metabolism. A method for detg. heat of combustion and C in urin is given. J. F. LYMAN.

Nitrogen Metabolism in Three Cases of Duodenal Feeding. MAX EINHORN AND JAC. ROSENBLOOM. *Intern. Beit. Pathol. Ther. Ernährungsstör.*, 3, No. 1, 5; through *Zentr. Biochem. Biophys.*, 12, 10.—Three patients suffering from ulcus ventriculi were nourished 14 d. with the aid of a duodenal tube. The absorption of N in the food proceeded normally. The N catabolism was normal. For the entire period of duodenal nutrition in all 3 cases there was a positive N balance. I. K. PHELPS.

The Significance of Oxygen for the Growth of the Tissues of Mammals. LEO LOEB AND MOYER S. FLEISCHER. Path. Lab., Barnard Free Skin and Cancer Hospital, St. Louis. *Biochem. Z.*, 36, 98–113.—Small fragments of the surviving rabbit kidney or testicle, or mouse carcinoma, were planted into steril plasma from rat or rabbit blood and the growth of the tissue was observed under different conditions. The plasma, which was from blood drawn into an ice-cooled tube and kept from coagulating before the tissue touched it, coagulated about or under the latter, according as the fragment was placed inside or on top of the plasma. Some of the tissues were incubated in air, some in an atm. from which the O had been absorbed or replaced by H, others in an atm. of pure O. The tissue fragments lying on the surface of the medium and exposed to pure O grew the most vigorously, those freely exposed to air only slightly less so. Fragments partially sepd. from air or O by being immersed in the coagula grew much less rapidly, and those kept in O-free enclosures became necrotic. The manner and degree of growth were observed microscopically. Carcinoma and normal organs appeared to be affected in the same manner, nor could any const. difference be observed between epithelium and connective tissue in this respect. D. D. VAN SLYKE.

The Calcium, Phosphorus and Magnesium Contents of Hay and Oats, the Feeding of which to Horses was Followed by Osteomalacia. A. SCHEUNERT, A. SCHATTKE AND E. LOETSCH. Tieraerzt. Hochschule, Dresden. *Biochem., Z.*, 36, 240–4.—The hay contained somewhat less Ca than ordinary hay. No other marked differences were found. D. D. VAN SLYKE.

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Nutritive Value of Buffalo and Cow Milk (MAGINI). 12.

SLAWKOWSKY, W.: **Die Amide und ihre Rolle im Stoffwechsel unterer Haustiere.** Wien: 8°, 25 pp., 1.60 M.

F. PHYSIOLOGY.

ANDREW HUNTER.

Some Experiments on the Solubility of Gases in Ox Blood and Ox Serum. ALEX. FINDLAY AND H. J. M. CREIGHTON. Chem. Dept., Univ. Birmingham. *Biochem. J.*, 5, 294–305.—The solubility of O, CO_2, CO, N_2O, and N in ox blood and ox serum was detd. at a temp. of 25° and under pressures varying from 760 to 1,400 mm. The solubility of O, CO_2, and CO in blood and of CO_2 in serum is greater than in H_2O; that of N and N_2O, in blood and in serum and of O and CO in serum, is less than in H_2O. Where the solubility is increased the solubility curves fall with increasing pressure; where the solubility is diminished the solubility curve rizes with increase of pressure. The increased absorption of O, CO, and CO_2 in blood and of CO_2 in serum is ascribed in the main to chem. combination. In the cases of diminished solubility, adsorption accounts for the rise in the solubility curve. F. J. BIRCHARD.

Trimethylamine as a Normal Constituent of Human Blood, Urin and Cerebrospinal Fluid. C. DORÉE AND F. GOLLA. Physiol. Lab., Univ. London. *Biochem. J.*, 5, 306–23.—Trimethylamine is a normal constituent of the blood and the cerebrospinal fluid, and possibly of urin. Choline is not normally present in the blood and cerebrospinal fluid and also could not be detected in urin. No method for detecting choline can be valid when the trimethylamine is not taken into account. A frequent source of error in attempts to bring about the periodide reaction with very small amts. of blood or cerebrospinal fluid lies in the diminished sensitiveness of the reagent due to the presence of neutral salts. This is obviated by the authors' distillation method. F. J. BIRCHARD.

Physiological Decomposition of Aliphatic Acids. ERNST FRIEDMANN. Univ. Berlin. *Med. Klinik*, 7, 1088–92.—The physiological decomp. of aliphatic acids appears to be the sum of different kinds of chem. reactions. Normal satd. acids can be decomposed into unsatd. acids or into ketonic acids, but the products are not necessarily distinctly of one class or the other; one can be derived from the other. The decomp. may be influenced by other processes besides oxidation. The decomp. of AcOH in the body is dependent on the hormones of the pancreas. Glycogen in the liver is thought to be a synthetic product. P. J. HANZLIK.

The Functions of the Infant's Stomach. C. M. GRECO. Kinderklin. Palermo. *La pediat.*, 18, 161–79; through *Zentr. Biochem. Biophys.*, 11, 883.—The results of numerous analyses show that Δ is higher for infant's gastric juice than for the blood and that it increases during the first 45 min. of the stay of milk in the stomach. The value for η increased the longer the milk stayed in the stomach. The acidity ran parallel with the time in the pylorus. It increases with the age of the child and is greater in children fed on cow's milk than in those naturally fed. No HCl nor active pepsin could be found in milk removed from the stomach after 45 min. I. K. PHELPS.

Chemistry of the Skin. VIII. The Loosely Combined Sulfur of Horn. P. G. UNNA AND L. GOLODETZ. *Monatsh. prakt. Dermat.*, 52, 505; through *Zentr. Biochem. Biophys.*, 11, 938.—The horns of oxen contain a large amt. of loosely combined S and the horny layer of the sole of the foot much less. The following reagent was used microchemically to identify loosely combined S by the brown to black color: 0.5 g. $Pb(OAc)_2$ was dissolved in 10 cc. H_2O and 10% NaOH soln. added until the ppt. formed dissolved on heating. By the use of this reagent it was found that the horny layer contained more loosely combined S than the prickle layer. The basal horny

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layer and the root sheath of the hair contain almost no loosely combined S. This S is held as cystine. No cystein could be identified. I. K. PHELPS.

Soluble Enzymes, Trypsin and Erepsin, of Lachrymal Glands. F. ALESSANDRO. Augenklinik. Messina. *Boll. sci. med.*, 9; through *Zentr. Biochem. Biophys.*, 11, 947.—Trypsin and erepsin were identified in the secretion of the tear glands. The significance in pathological conditions is obvious. I. K. PHELPS.

The Iron in the Urin of Domestic Animals. MAX REICH. Agr. Lab., Univ. Rostock. *Biochem. Z.*, 36, 210–39.—The urins were decomposed by Neumann's process, the HNO_3 being entirely replaced by H_2SO_4 at the end of the digestion. The Fe was pptd. by Neumann's "Zn reagent," redissolved, reduced by KI, and detd. by titration of the I set free. The amt. of Fe usually found was 1 mg. per kg. of urin. Addition of Fe to the food caused no increase in that of the urin of the dog, pig or sheep. The Fe in the urin of normal animals is all inorganic. D. D. VAN SLYKE.

The Distribution of Reducing Substances in Mammalian Blood. H. LYTTKENS AND J. SANDGREN. Med.-chem. Inst., Univ. Lund. *Biochem. Z.*, 36, 261–7.—Glucose in the following amts. was found in the plasma of: Man, 0.063; sheep, 0.064; pig, 0.082; ox, 0.086; horse, 0.098; rabbit, 0.222; guinea pig, 0.248 and cat, 0.291%. The smaller animals (the last 3), which have relatively greater surface area, more rapid loss of heat, and therefore require more vigorous combustion of body fuel, show 3–4 times the conc. of glucose in the plasma that the larger animals reveal. The corpuscles contain small amts., of reducing substance but no glucose, as is shown by the fact that the reducing power cannot be lowered by yeast fermentation. The negative results for glucose in the corpuscles are in direct disagreement with the positive results of Michaelis and Rona (*Biochem. Z.*, 16, 60 (1909)). D. D. VAN S.

The Dependence of the Action of Trypsin upon the Hydrogen Ion Concentration. LEONOR MICHAELIS AND HEINRICH DAVIDSOHN. Krankenhaus am Urban, Berlin. *Biochem. Z.*, 36, 280–90.—Peptone was digested by trypsin, the conditions being const. in parallel expts., except the H^+ conc. The latter was fixed at different values by addition of regulating mixts. of NaH_2PO_4 and NaOH, or of AcOH and AcONa, a sufficiently large amt. of the regulator being added so that the H^+ conc. was practically unaffected by the products of digestion. At intervals, for a time up to 90 min., portions of the digesting mixt. were withdrawn and titrated by Soerensen's formaldehyde method, the increase in the 0.1 *N* NaOH required being taken as the measure of digestion. The optimum for tryptic activity is a H^+ conc. of 10^{-8}. Trypsin is regarded as an amphoteric electrolyte, only the anions of which are proteolytic. The acid dissociation const. of trypsin is 5.10^{-8}. Increase of alkalinity until the H^+ conc. of the soln. has fallen to 10^{-8} increases the no. of trypsin anions and proportionally the tryptic activity. Further increase in alkalinity decreases the tryptic activity; perhaps because doubly charged, proteolytically inactive anions are formed. D. D. VAN SLYKE.

Remarks on the Article of Verzar, "The Magnitude of the Work of the Liver." OTTO PORGES. *Biochem. Z.*, 36, 342–3.—Defense against criticism of Verzar (*C. A.*, 5, 3841) concerning a previous article by P (*C. A.*, 4, 3108). D. D. VAN S.

The Surface Tension of Lymph. I. G. BUGLIA. Physiol Inst., Univ. Naples. *Biochem. Z.*, 36, 411–20.—Cannulas were introduced into the thoracic duct and femoral arteries of dogs, and specimens of blood and lymph were withdrawn before and after feeding meals of various kinds. The surface tension of the specimens was measured with Traube's stalagmometer. The tension of the blood showed no fluctuation after meals, but this may have been due to the fact that the samples withdrawn were from the general circulation instead of from the portal vein. The lymph remained unaltered after a meal of carbohydrates, but showed a marked drop in surface tension after

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ingestion of meat, and a still greater effect after a meal containing much fat. The sp. gr. decreased at the same time that the solid contents increased. This indicates, as already shown by other methods, that the fatty acids are absorbed into the lymph. The adsorption of fatty acids continues for a long time after the meal, the surface tension of the lymph reaching a minimum only after 10 hrs. *Ibid.*, 421–34.—Similar expts. with blood withdrawn from the vena subclavia and the substances under investigation introduced by fistulas directly into the stomach or duodenum, instead of being fed were conducted. Alc., Na taurocholate, Na soaps, and peptone, were the surface tension lowering substances administered. Alc. is rapidly absorbed from the stomach or intestin and enters both the lymph and the blood stream. Na taurocholate is not absorbed from the stomach, but is absorbed from the intestin into both blood and lymph. The soaps are also absorbed into both blood and lymph. Peptone does not pass the intestinal walls unchanged in detectable amts. In velocity of absorption, alc. exceeds the soaps and taurocholate. D. D. V. S.

Proteoses. E. ZUNZ. Inst. thérap., Univ. Bruxelles. *Bull. sci. acad. roy. belg.*, 1911, 653–734.—An extended study of the proteoses obtained from Witte peptone by the sep. procedures of Adler, of Haslam and of Pick. The proteoses of Pick present constancy of comp. The protoalbumose α of Haslam is similar to heteralbumose and the protoalbumose β to the protoalbumose of Pick. It is possible that the different methods of pptn. may change slightly the comp. of the substance in soln. Adler's method fails to afford the degree of purity in proteoses given by Pick's method. Haslam's proposed method of classification is found to be inexact. The biological properties of the proteoses are considered in detail. I. K. PHELPS.

Physical Chemical Investigations on Animal Liquids. VII. Chemical Reaction of Bile. G. QUAGLIARIELLO. Ist. fisiol. sper. r. univ. Napoli. *Atti accad. Lincei*, 20, II, 302–5; cf. *C. A.*, 6, 100.—The ratio C_{OH}/C_H, detd. by the electromotive method (*C. A.*, 5, 3589), for the bile of different animals of the same and of different kinds, varies from 0.087 to 29.0. Similarly, the acidity and basicity detd. by titrimetric methods vary between even wider limits than is the case for blood or lymph sera. These variations are probably due in great part to alimentary conditions.

CHAS. A. ROUILLER.

Bile from the Gall Bladder of the Ruminants. A. DANIEL-BRUNET AND C. ROLLAND. *Compt. rend. soc. biol.*, 71, 298–9.—From the analysis of 49 sep. samples of bile, d_{17}, ash, chlorides calc. as NaCl, P_2O_5, total N, Fe, fat, Na glycocholate and taurocholate, biliary nucleoproteins, cholesterols, and lecithins + neutral soaps were detd.

I. K. PHELPS.

Determination of Urea in the Blood. FRÉDÉRIC ARONSSOHN. *Compt. rend. soc. biol.*, 71, 346–8.—The total content of urea in the blood of men and animals is not found in the serum. I. K. PHELPS.

G. PATHOLOGY.

H. GIDEON WELLS.

Urinary Albumin Intermediate between True Albumin and Albumin Soluble in Acetic Acid. ROTHEA. *Bull. sci. pharmacolog.*, 18, 146–7.—On b. the urin after acidifying with AcOH, only a faint cloud was given. If not acidified, an abundant ppt. is obtained on b. When HNO_3 is added in drops to the urin, a stringy ppt. is produced. The albumin is like that of syphilitic patients but differs from it in that the HNO_3 ppt. is insol. in EtOH and from true albumin by its non-coagulability on b. in acidified H_2O. V. K. CHESNUT.

The Mechanism of the Action of Hog Cholera Immune Serum. WILLIAM SPÄT. Hyg. Inst. d. deutschen Univ. in Prag. *Z. Hyg.*, 69, 463–81.—There is no antitoxic

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action. The assumption of a bactericidal action was refuted; the serum is not destructive *in vitro* nor in animal tests, and differs from other bactericidal sera in that it is not exhausted by treatment with the bacteria. Treated sera retain their protective power in full; the only visible effect of the exhaustion is the loss of the complement-binding property. No opsonic action is noticeable above that of normal sera. The destruction of the bacteria is carried out by the leucocytes, and this bactericidal action can be developed without visible phagocytic action. The bactericidal · leucocytic action is more pronounced in naturally resistant animals. The hog cholera immune serum possesses all the properties of an antiaggressin immune serum. The duration of passive immunity is short, lasting 7 days in mice. H. J. CORPER.

Influence of Icterus on Pepsin Formation. ALEXANDER GRUBE. Exp. Biol. Abt. Path. Inst., Univ. Berlin. *Med. Klink*, **7**, 1662–3.—Dogs showed diminution in % and abs. pepsin content of the gastric juice after ligation of the common bile duct. P. J. HANZLIK.

The Meiostagmin Reaction in Vivo in Malignant Tumors. GUIDO IZAR. Royal University, Catania. *Ber. klin. Wochschr.*, **48**, 1748–51; cf. *C. A.*, **5**, 919.—The MeOH or ether exts. from pancreas or tumors were employed as antigen. The proper diln. of the antigen with 9 cc. of the $^1/_2$, $^1/_5$ or $^1/_{10}$ dild. blood serum was digested for 1 hr. at 50°. The ppt. formed after standing at room temp. for 6 hrs. was centrifuged, washed with NaCl soln. and the NaCl suspension or normal serum ext. of the ppt. injected into rabbits or guinea pigs. In 48 cases the results by these 2 methods and by the meiostagmin reaction *in vitro* were identical. The 3 methods may give negative results in true cases of tumors and positive tests in other pathological conditions. The reaction *in vitro* is more often positive in negative cases and especially so in cases when the blood is drawn during narcosis or when old sera are employed. The reactions *in vitro* are considered more reliable when a positive test is obtained. F. C. KOCH.

Icterus and Urobilinuria in Scarlet Fever. E. RACH AND A. V. REUSS. Padiatr. Klin. Univ., Vienna. *Jahrb. Kinderheilk.*, **72**, 422–58.—An icteric coloration of the skin appeared regularly in cases of scarlet fever. Urobilin and its chromogen were found in the urin for some days, in largest amts. on the 5–6th days of the illness, while bilirubin was seldom found. The urobilinuria and the icterus were dependent on the injury to the liver and to an increased destruction of the erythrocytes especially in the skin. H. B. LEWIS.

Acapnia and Glucosuria. YANDELL HENDERSON AND F. P. UNDERHILL. Physiol. Lab., Yale Med. School and Sheffield Lab. Physiol. Chem., Yale Univ. *Am. J. Physiol.*, **28**, 275–89.—Acapnia may reduce the capacity of the tissues to hold sugar, resulting in glucosuria or at least hyperglucemia. Acapnia is a concomitant of some forms of experimental glucosuria (peptone, piqure, pancreas and painting pancreas with piperidine, in some of which Edie, *et al.* (*C. A.*, **5**, 3106) have held that hypercapnia must occur. The impossibility of judging the internal conditions of tissue respiration from the external conditions to which the animal is exposed is pointed out. J. F. LYMAN.

Experimental Hemoglobinuria. CH. ACHARD AND E. FEUILLE. *Arch. Méd. Expér.*, **23**, 529–65.—Intravenous injections of cellular juices, and notably of aq. ext. of muscle, produce hemoglobinuria, but not hemoglobinemia, in the dog. Injection of muscular hemoglobin transformed into methemoglobin, or carboxyhemoglobin, has the same effect. There is no deposition of blood pigment in the renal epithelium, but such can be produced by injections of hemoglobin into the kidney by way of the ureters. Muscle ext. pptd. by NaCl, or modified by ultraviolet rays, is much less toxic. The ext. of kidneys during the hemoglobinuria is not hemolytic *in vitro*. J. H. MITCHELL.

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Alterations in Hemolytic Immune Body which Occur during Processes of Immunization. C. H. BROWNING AND G. H. WILSON. U. of Glasgow. *J. Hyg.*, 11, 208–19.—The immune bodies formed after intraperitoneal injection of rabbits with ox erythrocytes show qualitative differences at different stages of immunization. Those appearing 4 to 8 days after 1 injection are deficient in the power of causing absorption of complement when added to the corresponding red blood cells. This is very clearly shown by the slight increase in complement absorbed under the influence of multiple doses of immune body as compared with the absorption induced by 1 dose. The deficient complement absorption does not depend on deficient combination of immune body with the receptors of the red cells. After the production of an immune body which is very active in absorption of complement, it is found that the complement-combining power remains high after the immune body content of the serum, as measured by the hemolytic dose, has fallen to a marked degree. J. H. MITCHELL.

Attempts to Cause the Formation of Cytolysins and Precipitins in Certain Invertebrates. G. H. DREW. *J. Hyg.*, 11, 188–92.—All attempts to produce these antibodies in *Arca ponderosa*, *Pecten dislocatus*, *P. maximus*, *P. opercularis*, *Echinus acutus* and *E. miliaris* were unsuccessful. J. H. MITCHELL.

Immunity of Guinea Pigs to Diphtheria Toxin and its Effect upon the Offspring. H. J. SUDMERSEN AND A. T. GLENNY. Wellcome Phy. Research Lab. *J. Hyg.*, 11, 220–34.—Diphtheria toxin-antitoxin mixts. induce a higher immunity in guinea pigs than sublethal doses of toxin, one injection being sufficient to produce an immunity lasting in some cases for over 2 yrs., as shown by passive immunity conferred on the offspring. The greatest immunity is produced by toxin-antitoxin mixts. containing the most uncombined toxoid. The active immunity of the mother is transferred passively to the offspring. The passive immunity thus transferred usually disappears at the end of 2 months after birth. The immunity is transferred *in utero*, and to a slight extent during lactation. The young, bred from pigs that have been used for a single reactive antitoxin test, may be able to tolerate 14 times the amt. of toxin fatal to a normal pig. J. H. MITCHELL.

Changes Produced in the Blood and Bone Marrow by Hemorrhage and by Blood Destruction. II. C. P. JONES. Guy's Hospital. *J. Path. Bact.*, 16, 48–70.—In a previous paper (*J. Path. Bact.*, 15, 4) the changes in the blood and bone marrow after hemorrhage were studied. In the present paper it is shown that after receiving 10 cc. of a 1% soln. of $C_6H_5NH.NH_2$ the erythrocyte regeneration in the rabbit is arrested or masked for at least 6 days, differing in this respect from hemorrhage. The cause of the delay is thought to be due to the direct toxic action on the bone marrow. The color index is higher after $C_6H_5NH.NH_2$ than after hemorrhage, and the blood shows a higher grade of megalocytes. J. H. MITCHELL.

Autointoxication and Experimental Nephritis in Rabbits. W. H. HARVEY Cambridge. *J. Path. Bact.*, 16, 95–105.—Chronic nephritis was produced by feeding and by intravenous injection of a product of protein decomp., *p*-hydroxyphenylethylamine. The extent of the renal lesions was not indicated by the condition of the urin. The nephritis was found to be secondary to vascular sclerosis, which first occurred in the aorta, then in the renal arterioles, and finally parenchymatous and interstitial changes took place. J. H. MITCHELL.

The Action of Cholesterol Derivatives with Lecithin in the Syphilis Reaction. C. H. BROWNING AND J. CRUICKSHANK. *J. Path. Bact.*, 16, 135–6.—Two factors were studied: (1) The physical state of the mixt., and (2) the chem. constitution of the substance. The physical state depends on the manner of mixing; rapid mixing yields colloidal solns.; slow addition of H_2O produces suspensions. The suspensions are more

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efficient than the colloidal solns. The inhibitory action on lecithin venom hemolysis is shown to be due to the interaction between lecithin and cholesterol (adsorption). No deriv. has been found equal to cholesterol itself in either reaction. J. H. M.

Lipochrome in the Ganglion Cells in Insanity. V. TIRELLI. Irrenanstalt. Turin. *Giorn. r. accad. med. Torino*, 73, 3–13; through *Zentr. Biochem. Biophys.*, 11, 895.—A lipochrome was found in the ganglion cells of the brain and cord in health in quantities proportional to the age. It appears in abnormally large amts. characteristically in epilepsy and other forms of insanity and sometimes in progressive paralysis. I. K. PHELPS.

Air in the Pneumothorax. FR. TOBIESEN. Oeresund-Krankenhaus. Kopenhagen. *Beit. Klin. Tuberk.*, 19, 451–7; through *Zentr. Biochem. Biophys.*, 12, 9.—Expts. with pleural air from spontaneous and artificial pneumothorax proves the earlier assumptions that the air of the open pneumothorax is rich in O, of the closed poor in O and rich in CO_2, containing more than 5%. The content of O is diminished rapidly at first, but recovers slowly. During long duration of pneumothorax and by the presence of pleuritis, O can entirely disappear. The content of N in closed pneumothorax is constantly 90%. I. K. PHELPS.

Active Constituents of Rice Grits Preventing Bird Polyneuritis. U. SUZUKI AND T. SHIMAMURA. Univ. Tokio. *J. Tokyo Chem. Soc.*, 32; through *Zentr. Biochem. Biophys.*, 12, 11.—Assuming that bird polyneuritis might be caused by feeding with polished rice alone the cause of this was sought as follows: Grits freed from fat were extracted with hot 95% alc., and the alc. ext. shaken out with Et_2O to remove organic acids, lecithin, etc., before filtering. The clear filtrate was decomposed with dil. H_2SO_4 until the liquid contained 3–4% of H_2SO_4 when it was pptd. with 20% phosphotungstic acid, drained off and decomposed with $Ba(OH)_2$ and again drained off. The excess of $Ba(OH)_2$ was removed with H_2SO_4, and the filtrate distilled under diminished pressure, leaving a yellow-brown sirup corresponding to 0.3% of grits freed from fat. The sirup both prophylactically and therapeutically was very active in combatting polyneuritis in birds. It reacted acid, reduced Fehling soln. slightly, gave no biuret reaction, gave a positive Millon, contained N and organic S, but no P. It gave the characteristic Ehrlich diazo reaction. An acid was isolated, which, when heated with 2% HCl, gave yellow needles or prisms, m. 300°. These crystals gave the Millon and diazo reactions. The liquid filtered from the crystals strongly reduced Fehling soln. From these properties the acid is supposed to be a glucoside. I. K. PHELPS.

Distribution of Water in the Bodies of Infants in Marked Variations of Body Weight. M. BEREND AND E. TEZNER. Budapest. *Orvosi hetilap*, 55, 343–8; through *Zentr. Biochem. Biophys.*, 12, 63–4.—The protein content, the viscosity and the elec. cond. of the blood, the body wt., the vol. of the blood cells, and the elasticity of the skin (by a specially devized turgometer) were detd. in a no. of infants, some in severe febril condition and others after feeding a soln. of 5 g. NaCl and 5 g. $NaHCO_3$ in 1 l. H_2O *per os* as the sole nourishment for 24 hrs. In fever, the blood becomes more conc. The excretion of solids does not run parallel but rather behind the loss of H_2O in the body. In feeding the salt soln. body wt. increased with a few exceptions. Elec. cond. increased while protein content, viscosity and vol. of blood cells decreased. The conditions lasted for about 24 hrs. I. K. PHELPS.

Exophthalmic Goiter. HEINRICH KLOSE. Chir. Klin., Frankfurt a/M. *Arch. klin. chir.*, 95, 649–62; through *Zentr. Biochem. Biophys.*, 12, 68.—Dogs injected with the press juice of fresh material from an exophthalmic goiter gave the characteristic symptoms of that disease as did dogs injected with KI soln. Dogs similarly treated with juice from an ordinary goiter did not react similarly. The poison of the exophthalmic

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goiter juice is very labil since only very fresh juices give these results. The hypothesis is that in exopthalmic goiter the thyroid is unable to store up I as iodothyrin and sets it free in such a form that it becomes inorg. I in the organism. I. K. PHELPS.

A Consideration of some Chemical Transformations of Proteins and their Possible Bearing on Problems in Pathology. F. P. UNDERHILL. Sheffield Lab. of Physiol. Chem., Yale Univ. *Arch. Intern. Med.*, 8, 356–81. W. C. ROSE.

The Incoagulable Nitrogen of Puncture Fluids with Special Reference to Cancer. A Preliminary Note. R. S. MORRIS. Clin. Lab., Johns Hopkins Univ. and Hosp. *Arch. Intern. Med.*, 8, 457–62.—From limited data, in which it appears that the non-coagulable N of cerebrospinal fluid is somewhat increased by malignant growths, M. suggests that this fact may serve as a diagnostic aid. He believes that the higher values in cancer are due to the activity of proteolytic enzymes excreted by the neoplasm. W. C. ROSE.

Amboceptors and Receptors. I. J. MORGENROTH AND F. ROSENTHAL. Path. Inst., Univ. Berlin. *Biochem. Z.*, 36, 190–208.—The no. of units of hemolytic amboceptor (rabbit immunized against goat) which must be bound by a given amt. of corpuscles, in order that when these are mixed with an equal amt. of fresh cells 1 unit of amboceptor shall be given off to the latter, is not const. but varies from 2–12. In general it decreases when the amboceptor is weakened by age or heating at 65°. A given no. of units of amboceptor weakened by heating cause hemolysis more rapidly than the same no. of units of fresh amboceptor. D. D. VAN SLYKE.

Antitrypsin of Blood Serum in Carcinoma. A. ZITRONBLATT. Chir. Abt. Alt-Katherinenkrankenhaus, Moscow. *Wratschebna Gazeta*, 1911, Nos. 17–18; through *Z. Immunität., Ref.*, 4, 621.—An increase in the antitryptic strength of the blood is present in 90% of all carcinomas, and less frequently with sarcoma. Amt. is not parallel to size of tumor, condition of nutrition or amt. of hemoglobin. Leucocytosis prevents increase of antitrypsin. The best method of det. antitrypsin is that of Marcus, with Löffler plates. H. G. W.

Experimental Increase of Phagocytosis. G. S. MILKOWICZ. Bakt. Lab., Ujasdow Militärhosp., Warszawa. *Russky Wratsch*, 1911, No. 22, 943; through *Z. Immunität., Ref.*, 4, 593.—Lecithin and cholesterol cause *in vitro* a great increase in phagocytosis of staphylococcus and tubercle bacilli. Adrenaline has the same effect, and in tuberculosis the same effect is shown by tuberculin. Thyroidin and thymic acid have little favorable influence and sometimes they decrease phagocytosis. Ca peroxide increases phagocytosis, but inconstantly. The effect of the lipoids is manifested either with or without the presence of opsonins. H. G. W.

H. PHARMACOLOGY.

ALFRED N. RICHARDS.

Pharmacological Researches on Picrotoxin, Picrotin and Picrotoxinin. ALFREDO CHISTONI. Inst. Farm. Univ. Napoli. *Arch. farm. sper.*, 12, 385–417.—The toxicity of picrotoxinin is double that of picrotoxin, while picrotin is without physiological effect. The action of the first two, in small and repeated doses, is not cumulative. Picrotoxin, taken by way of the stomach, is completely absorbed and eliminated partly as such by the kidneys; picrotin is eliminated both in the urin and in the feces; picrotoxinin is not recovered either in the urin or feces. In cold-blooded animals picrotoxin and picrotoxinin increase the cutaneous secretion, in mammifera the salivary and lacrimal secretions, but in both cases inhibit the secretion of urin. A. W. DOX.

Action of some Alkaloids on the Ureopoiesis of the Liver in vitro. G. B. ZANDA. Inst. Mat. Med. Univ. Genova. *Arch farm. sper.*, 12, 418–23.—Salts of alkaloids (cocaine, morphine, quinine, quinidine, strychnine), according to the amt. present, re-

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tard or even suppress the synthesis of urea by dog liver *in vitro*. The only exception was cocaine, which in small amts. (0.1–0.25%), slightly increased the ureopoiesis.
A. W. Dox.

The Swelling of Nerve Fibers. J. Bauer. Wien. *Z. Chem. Ind. Kolloide*, 9, 112–6.—"Hirnschwellung," an increased swelling capacity of the central nervous system, is similar to the edema of other organs, and it results from conditions which induce edema in other organs. Does increased acid conc. increase the swelling capacity of the nerve colloids was the question advanced in this investigation. The central nervous system being especially rich in lipoids, the swelling of which is decreased with increased acid conc. leads to the conclusion that acids should have the opposit effect on it from that on the other organs, in which protein predominates. A series of detns. of the swelling of the spinal cord and gray and white brain substance in different acids shows that these act very differently from the other organic structures previously examd. Nerve fibers of dogs and cats are decreased in swelling capacity by H_2SO_4, HCl, HNO_3, AcOH and lactic acid in concs. of 0.0005 *N* and up; of man the decrease begins at 0.001 *N*. Concs. under these amts. may either decrease or increase the swelling depending on the nature of the acid and the nerve fiber. The order of the acids for 0.01 *N* is $H_3BO_3 < HCl < HNO_3 < H_2SO_4$ = lactic acid = AcOH in the effect of decreasing the swelling. Dil. alk. solns. increase the swelling. All salt solns. investigated decrease the swelling. In physiological salt soln. the gray swells more than the white and likewise for greater concs. of KCl, KBr and KI, while for greater concs. of NaCl, Na_2SO_4, the white swells more than the gray. The gray does not swell in 6% NaCl. The gray matter swells less than the white in both water and acid solns. The brain of new born swells less than the gray and white of grown animals, probably because of its already greater water content. Non-electrolytes, such as glycerol, urea, dextrose and chloral hydrate decrease the swelling in neutral and acid solns.
H. Isham.

The Physiological Effects of Alkaloids of Zygadenus intermedius. P. H. Mitchell and George Smith. Biol. Lab., Brown Univ. *Am. J. Physiol.*, 28, 318–29.—An alkaloid prep., furnished by Heyl and Raiford (*C. A.*, 5, 2118), was administered to guinea pigs, frogs and dogs. The prep. used slows respiration, heart beat, and causes vasodilation with a fall of blood pressure. The fatal dose, 4.6–5.1 mg. per 100 g. guinea pig, stops the heart before respiration ceases. It has a powerful action both as an emetic and as a purgative.
J. F. Lyman.

Action of Magnesium Sulfate in Concentrated Solution on some Protoplasms. E. Fauré-Fremiet. *Compt. rend. soc. biol.*, 17, 316–7.—The dissolving and pptg. action of $MgSO_4$ on the parts of the infusoria *Strombidium sulcatum* and *Condylostoma patulum* is described.
I. K. Phelps.

Fate of Glucose Mercaptals in the Animal Body. Luciano Pigorini. Inst. physiol. Chem., Rome. *Arch. farmacol.*, 10, 1–2; through *Zentr. Biochem. Biophys.*, 11, 910.—The ability of different animals (guinea pigs and dogs) to hydrolyze mercaptals is the reverse of their ability to hydrolyze glucosides. For example, benzyl mercaptal was decompd. for the most part in dogs and not at all in guinea pigs. Similarly Et mercaptal is hydrolyzed in dogs, although Fischer supposed that the substance was destructive to protoplasm.
I. K. Phelps.

Transformation of Morphine in an Animal Accustomed to the Poison. M. Albanese. Pharm. Inst., Pavia. *Arch. ital. biol.*, 53, 439–44; through *Zentr. Biochem. Biophys.*, 11, 911.—The liver of dogs accustomed to morphine showed no marked action on morphine brought in contact with it *in vitro*. The contrary result followed if the livers were taken from animals accustomed to morphine, that had had no morphine

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for 3 or 4 ds. Such livers at 38° *in vitro* destroyed considerable amounts of morphine, the amt. apparently being in proportion to that given regularly to the animal before the period of rest. Similarly, the exts. made by extracting the liver of morphine-treated animals with 5–6 parts of physiological NaCl soln., with frequent shaking at 38° for an hr. and filtering through linen, were found to destroy morphine but less vigorously. Other organs and tissues seem to have the power to destroy morphine similarly, although less actively than the liver. I. K. PHELPS.

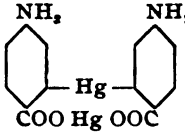
Pharmacological Properties of Picric Acid. FRANCESCO MOTOLESE. Pharmakol. Inst. Florenz. *Arch. farmacol.*, 9; through *Zentr. Biochem. Biophys.*, 11, 911.—Infusoria and the leucocytes from the dorsal lymph sac of a frog were treated with picric acid. In solns. of 1 : 5000 to 1 : 10000 a negative chemotactic action followed with the infusoria; the leucocytes were more or less completely dissolved. Solns of 1 : 15000 were inactive with leucocytes. As an astringent picric acid is more active than $ZnSO_4$ alum, and $Pb(OAc)_2$ and about of equal power with basic Pb $(OAc)_2$ and tannic acid. The permeability of the living cornea to picric acid is low, increasing after death. The conjunctiva offers some resistance but is more permeable than the cornea. The bactericidal power of picric acid is strongest in aq. soln. I. K. PHELPS.

Catha Edulis. Pharmacology and Pharmacodynamics. J. CHEVALIER. Lab. Pharmacol. et mat. méd. de Fac. med., Paris. *Bull. gén. Thérap.*, 161, 572; through *Zentr. Biochem. Biophys.*, 11, 959.—Catine, isolated first by Beitter, and cocaine have similar effects upon the nervous tissue. Catine also approaches in effects those of small doses of morphine without the analgesic and anesthetic properties of the latter. Catine also has cardiotonic effects similar to caffeine. I. K. PHELPS.

Ferrovose (Ferro-alkali Albumin), Organic Iron Entirely Assimilable, Organic Combination of Iron and of Products Derived from White of Egg (Ovalbumose). ANDRÉ LEFEVRE AND HILDT. *Bull. gén. Thérap.*, 161, 774; through *Zentr. Biochem. Biophys.*, 11, 959.—$Fe(OH)_3$ is dissolved with white of egg in absence of air. The product is subjected to hydrolysis. After filtration from a little FeS the soln. is pptd. by acid. The product has its Fe in the lower condition of oxidation and totally in organic combination. It is sol. in dil. alkalies or acids of about 0.5% strength. No expts. concerning assimilability were made. I. K. PHELPS.

The Mechanism of the Antagonistic Action of Salts. JACQUES LOEB. Rockefeller Institute, New York. *Biochem. Z.*, 36, 275–9.—The fact that pure NaCl solns. are toxic for fish and eggs, while solns. containing NaCl, $CaCl_2$ and KCl are not toxic, is explained by the possibility that the 3 salts together cause the cell membrane to become so *impermeable* that the cell is protected from the entrance of toxic amts. of any of the salts. D. D. VAN SLYKE.

Influence of Potassium Iodide on the Deposition of Mercury in the Liver. FERDINAND BLUMENTHAL AND KURT OPPENHEIM. Path. Inst., Berlin. *Biochem. Z.*, 36, 291–300.—Various preps. of Hg were administered to rats and rabbits *per os* and by injection. The administration of most preps. (nitrobenzoate of Hg, $HgCl_2$, "asurol") was followed by excretion of Hg in the intestin and its deposition in the liver. No Hg could be detected in the blood, lungs, or brain. Diamino-mercury benzoate



on the other hand was not deposited in the body. The excretion in the urin continued for 2 weeks after the injections. Of the other preps. the general rule holds, that the

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sol. forms are excreted more rapidly than the insol., and that less of the former is pptd. at the site of injection than of the latter. By addition of KI to the Hg dose the deposition of Hg in the liver was greatly reduced. D. D. VAN SLYKE.

Hemolysis by Ammonia. ED. STADLER AND H. KLEEMANN. Med. Klinik, Leipzig. *Biochem. Z.*, 36, 301–20; cf. *C. A.*, 5, 2260.—Washed corpuscles were shaken up with NH_3 of 0.05 to 0.005 *N* conc., centrifugated, and the NH_3 taken up by the cells detd. by titration with 0.001 *N* H_2SO_4. When the corpuscles had been washed with physiological salt soln. the NH_3 was taken up in accordance with the exponential formula of adsorption $x/a = kc^{\frac{1}{m}}$, *c* indicating the initial conc. of NH_3, *x* the amt. adsorbed and *a* the vol. of the corpuscles. The value of *m* was about 0.4. When the corpuscles have been washed with isotonic sugar soln. instead of saline, the NH_3 is taken up in the same manner, but the course of the hemolysis is different. The presence of peptone or serum hinders the hemolysis. This effect is at least partly due to a decreased adsorption of the NH_3. Blood preserved 24 hrs. in cane sugar soln. is hemolyzed more rapidly by NH_3 than is fresh blood. The older blood adsorbs more NH_3. **Hemolysis by Acetic Acid.** *Ibid.*, 36, 321–34.—Blood of the sheep, rabbit and man was used. The corpuscles suspended in isotonic sugar soln. take up AcOH according to the exponential adsorption formula. Between the rate of hemolysis and the AcOH conc., however, no definit numerical relation could be formulated. The same rules apply to hemolysis of corpuscles in physiological salt soln., but the hemolysis here occurs more rapidly than in cane sugar soln. Serum strongly inhibits hydrolysis by AcOH, chiefly because the serum binds a portion of the acid. Increase of the proportion of blood cells in the AcOH soln. does not result in a proportional increase in the amt. of AcOH adsorbed, the amt. of the latter taken up by a given amt. of cells being less, and the resulting hemolysis slower. D. D. V. S.

The Influence of Saponin on the Physiological Activity of Digitoxin. I. POSTOJEFF. Kgl. Path. Inst. d. Univ. Berlin. *Biochem. Z.*, 36, 335–41.—As saponin has been reported present in the leaves of digitalis, P. investigated the effect of saponin on the action of the digitoxin. The substances were tested on the isolated frog's heart. Doses of digitoxin over 0.025 mg. caused death of the heart within $^1/_2$ hr. Doses under 0.02 mg. did not, but when non-toxic doses (0.02 mg.) of quillasaponin were added death occurred. D. D. VAN SLYKE.

The Action of the Nucleic Acids on the Fermentive Processes in the Animal Organism. M. CHERNORSKII. Imperial Inst. Expt. Med., St. Petersburg. *Biochem. Z.*, 36, 363–75.—Four pups out of a litter of 5 were treated with Na salt of yeast nucleic acid in doses up to 1.5 g., the treatment beginning when the animals were 2 mos. old and continuing for 4.5–5.5 mos. The total amts. administered were 48–86 g. per animal, the doses being given to each animal in a different way, subcutaneously, intravenously, intraperitoneally, or *per os*. Only the heaviest doses caused symptoms of illness, and these lasted but a few hrs. The greatest effect on the ferments of the organs were caused by the intravenous injections, the least by the subcutaneous. Of all the ferments tested for, amylase, dextrinase, catalase, nuclease, protease, lipase and lecithase, the amylase was most affected. The ferments of the brain were more affected than those of any other organ. In the brain amylase was increased 400 times, dextrinase 4.4 times, and protease 10 times, compared with the control. In the lungs amylase was increased 250 times, in the muscles amylase was increased 6.4 times, and in the thymus lipase was increased to 2.5 times normal. The therapeutic value of the nucleic acid may be due to its effects on the ferments. D. D. VAN SLYKE.

The Law Regulating Hemolysis of Erythrocytes in Hyposmotic Saline Solution or Distilled Water. U. N. BRAHMACHARI. Campbell Med. School, Calcutta. *Biochem. J.*, 5, 291–3.—The amt. of hemoglobin dissolved in a given vol. of hyposmotic NaCl

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soln. or dist. H_2O was found to be proportional to the amt. of hemoglobin in the erythrocytes presented for soln. in the form of a suspension. The ratio between the two factors noted above varies in different animals, being the smallest in the case of the frog and greatest in the sheep. In the case of the rabbit it is also very high. It is fairly const. in healthy individuals but shows wide variations in disease. Hemoglobin as it exists inside erythrocytes is in a state of suspension. F. J. BIRCHARD.

The Action of Certain Sulfur Compounds on Metabolism and Excretion. CHARLES JONES. Biochem. Lab., Univ. Liverpool. *Biochem. J.*, 5, 427–41.—Expts. were made on rabbits. It was shown that hypodermic injections of sulfates, hyposulfites, sulfites and sulfides, interfere with oxidation processes, the sulfates when in large amt. by preventing exchange between the blood stream and the cells. When the amt. of sulfate is small this action is not noticed, but a stage of stimulation occurs, the sulfate causing a marked diuresis, sometimes accompanied by the excretion of more sulfates than were injected into the body together with the amt. in the food. Sulfate also has a marked irritant action on the kidney cells if more than a small amt. is present. A purgative action was not usual. $CaCO_3$, $CaHPO_4$ and CaC_2O_4 occur in the urin after large doses of sulfate, probably as a result of incomplete oxidation. Hyposulfite acted very similarly to sulfate. The action of sulfites and sulfides was essentially the same. In some cases they were at once oxidized and then acted as the sulfates. If the animal is deficient in oxidizing ferments the sulfite appears to unite with and neutralize the action of the tissue ferments. Sulfide appears to unite with some constituent of the cell itself. Both sulfate and sulfite interfere with tissue changes and if in sufficient quantity they stop all metabolic changes and the animal dies of failure of respiration and circulation. If the sulfite is sub-lethal in amt. it is attacked by the oxidizing ferments and gradually eliminated as sulfate. In the case of sulfite, when the toxic dose is large the resultant sulfate gives the diuretic action but in the case of sulfide the amt. of sulfate is so small that little or no diuresis is seen. Both sulfide and sulfite cause the excretion of Ca as carbonate phosphate and oxalate. Intense renal irritation also occurs. The question as to the possibility of sulfates being a cause of cirrhosis of the liver and chronic nephritis is raised. F. J. B.

Studies on Melanin. III. The Inhibitory Action of Certain Phenolic Substances upon Tyrosinase. *J. Biol. Chem.*, 10, 113–22.—Aromatic compds. carrying 2 OH radicles are capable of inhibiting the action of tyrosinase on tyrosine or other chromogens. Dominant whites do not contain a pigment which is lacking in recessive whites. S. R. BENEDICT.

I. ZOOLOGY.

R. A. GORTNER.

The Eggs of Mactra. K. KOSTANECKI. *Bull. intern. acad. sci. Cracovie*, 1911, 146–61; through *Zentr. Biochem. Biophys.*, 12, 59.—Eggs of the *Mactra* put into a mixt. of 2.5 *N* KCl soln. and sea water (10 : 90) after the polar globules have developed return to the spherical form and do not divide. If, however, the eggs are put into fresh sea water after 1 hr. in the KCl mixt., they develop 18–20 hrs. later into normal individuals. Longer periods than 1 hr. work harm. Eggs which have developed only 1 polar globule develop on the following day to the ciliary stage. Eggs put into the KCl mixt. immediately after fertilization shrivel. After these are put into fresh sea water polar globules develop and division begins but the development is abnormal. Eggs stimulated into parthenogenetic development by KCl have a surface impermeable to the spermatozoa. Hence the KCl soln. which stimulates an unfertilized egg to development, inhibits the development of a fertilized egg. I. K. PHELPS.

Comparative Chemical Examination of Sea and Land Animals. F. ALESSANDRO. Inst. fisiol. R. Univ. Messina. *Congresso di oftalmologia Palermo, April*, 1911; through

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Zentr. Biochem. Biophys., 11, 940.—Analyses of the eyeball of the following land animals: *Canis familiaris, Sus scrofa dormestica, Bos taurus and Capra hircus*, were made and compared with those of the sea animals, *Exiphia glaudius, Thynnus vulgaris* and *T. alalunga*. They were found to vary in content of H_2O and of solid substances. The H_2O content of the cryst. lens and of the vitreous humour, of the sclerotic coat, and of the uvea is considerably larger in sea animals. The reverse is true for the content of solid constituents, although for the retina the content of solid constituents is greater for sea than for land animals. I. K. PHELPS.

Studies on Melanin. II. The Pigmentation of the Adult Periodical Cicada (Tibicen septendecim L.). ROSS A. GORTNER. Carnegie Inst., Washington. *J. Biol. Chem.*, 10, 89–94; cf. *C. A.*, 5, 302.—The pigmentation of the periodical cicada is due to the interaction of a chromogen and an oxidase of the tyrosinase group. The oxidase is not present in the body of the pupa or adult as such, but is apparently secreted together with the new cuticula. The tyrosinase is rendered inactive by alc. or by prolonged dialysis in collodion bags. S. R. BENEDICT.

12. FOODS.

W. D. BIGELOW.

Official Methods for the Analysis of Foods (French). Cocoa and Chocolates. ANON. *Ann. fals.*, 4, 417–7.—Moisture is detd. by heating 6 hrs. at 100–5°. The ash does not in general exceed 4%, or 9% in cocoa free of water and fat. The addition of alkaline substances to cocoa is detected by adding to 10 g. of ash 10 cc. of *N* H_2SO_4, heating just to b., keeping at this temp. for 10 min. and titrating while hot with *N* KOH, with phenolph. as indicator. Titration of the water-sol. ash does not give satisfactory results. The results calc. to K_2CO_3 and calc. to a basis of 100 g. water- and fat-free cocoa should not be above 2.75% in a cocoa to which no alkali has been added. Fat is detd. by placing 3 g. in a metallic tube, agitating with ether, centrifuging, pouring off the ether and repeating. The combined ether exts. are evapd. and residue weighed. An alternate method without centrifuging is given. Material sol. and insol. in water, starch and sugars are detd. in the usual manner. A double dilution method is used in the polariscopic detn. of sucrose. For milk chocolate, moisture, ash and fat are detd. in the usual manner. For casein, lactose, sucrose and other materials sol. in water, the residue from the detn. of fat is taken and treated with 30 cc. of a 1% soln. of PI_3 for $^1/_2$ hr., the temp. raised to 60°, agitated, centrifuged and poured off; repeat 3 times. The combined soln. is made up to 150 cc. and aliquots taken. Lactose is detd. with Fehling's soln. Sucrose is inverted and similarly detd. For casein 50 cc. are taken, 50 cc. of water and 1 cc. of trichloroacetic acid added. The soln. is heated to 100° and filtered on a weighed filter. Microscopic studies with drawings of the various parts of the cocoa bean are given. M. C. ALBRECH.

Investigations of Milk Enzyme. A. GIFFHORN. *Diss. Bern*, 1909; through *Milchwirtsch. Zentr.*, 2, 236.—A series of ferment reactions was carried out with market milk. For peroxidases, the reaction was tried with "active" guaiac tincture and without addition of H_2O_2. G. found that the reaction is hastened by H_2O_2 when added after the guaiac tincture; it is retarded if H_2O_2 is added before guaiac. Only in individual cases was decrease in the intensity of the reaction observed in the case of incipient souring and coagulation. Milk of cows having diseased udders reacted more strongly than normal milk; the reaction was prevented by heating the milk 30 min. and did not occur on cooling again. Formalin-methylene blue was decolorized within 5 to 12 min. by milk, while methylene blue without formalin was not changed after an hour. The

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power of reduction increased with increasing age, both with and without the formalin. *Results:* (1) Fresh, normal mixed milk always gives the reaction with "active" guaiac tincture, reduces methylene blue soln. containing formalin in 5 to 12 min., decomposes 0.010 to 0.025 g. sol. starch and has a catalase content of 5 to 30 mm. (2) Mixed milk which reduced a formalin-methylene-blue soln. in 1 to 5 min. has a high catalase content but a normal diastase content; it is very impure and unfit to use. (3) A mixed milk which, with a low content of diastase and a high catalase content, reduces a formalin-methylene-blue soln. within 5 min., a formalin-free soln. within an hour., is too old for use as food. (4) Mixed milk decomposing 0.025 g. starch, having a high catalase content, not reducing soln. of formalin-methylene blue quickly, nor methylene blue within an hr., contains milk from cows having diseased udders. (5) Mixed milk giving no guaiac reaction, containing no diastase, decolorizing both methylene-blue solns. within an hr. and having a high catalase content, has been heated above 72° and was high in bacterial content before heating and has stood a considerable time. (6) Mixed milk giving the guaiac reaction but not decomposing starch has been heated to 65°–72° for 30 min. L. L. VAN SLYKE.

Roumanian Sheep Cheese. D. FRANZOPOL. *Milchwirtsch. Zentr.*, 2, 289–96.—Analyses of several varieties of cheese of different ages. L. L. V. S.

Bacterial Origin of Dark Coloration on Upper Surface of Hard Cheeses. A. WOLFF. Dairy Exp. Sta., Kiel. *Milchwirtsch. Zentr.*, 2, 296–304. L. L. V. S.

Composition of Cow's Milk Drawn by Suckling Calf. O. WELLMANN. Royal Veterinary High School, Budapest. *Milchwirtsch. Zentr.*, 2, 304–12.—The comp. of cow's milk drawn by a calf, as compared with that milked in the ordinary way, is not appreciably different. The fat content in the total amt. of milk drawn by a calf at one meal varied widely. However drawn, the first portions contain least fat, the succeeding portions containing an increasing % of fat. The first milk drawn by a calf contained 1.3% of fat; that last drawn, 11.5%. The fat-free solids and the proteins are nearly const. during suction, although these constituents appear to be present in smaller amts. in the milk last drawn. Milk sucked out by a calf contains at first 7.9 to 11.3% of saliva. The secretion of saliva becomes continually less, so that in the last portions sucked no saliva is apparent. L. L. VAN SLYKE.

Are Free Volatil Acids Present in Fresh Normal Milk? W. D. KOOPER. Dairy Lab., Güstrow. *Milchwirtsch. Zentr.*, 2, 312–4—When fresh, normal milk is treated with a small amt. of H_3PO_4 and then distilled in steam, volatil acid compds. are found in the distillate, the acidity of which is about equal to 7.2 cc. 0.1 *N* NaOH. Butyric acid forms the larger part. Is there decomp. of milk-fat during distillation or do these volatil acids exist in the milk? Skim-milk with little fat gives a higher acidity in distillation in some cases than cream. The acidity of distillate is independent of amt. of milk fat. The acidity is higher in distillate in case of sour milk, probably due to carrying over of lactic acid. L. L. VAN SLYKE.

Investigations Relative to Catalases. W. D. KOOPER. Dairy Lab., Güstrow. *Milchwirtsch. Zentr.*, 2, 264–71.—A comparative study of different methods of detg. the catalase in milk, which are found to give disagreeing results. The methods compared are those of Koning, Funke, Henckel and Gerber. The tests were applied to normal fresh milk of different breeds of cows and to buttermilk, cream and sour milk. The results obtained with fresh milk show relative variations as follows: Koning, 1; Funke, 1.37; Henckel, 1.44; Gerber, 1.66; in buttermilk, cream and sour milk, the relative results are different. Breed appears to have marked influence on catalase content. Milk drawn steril and treated with $CHCl_3$ shows a very low catalase content Therefore, the catalase originally in milk is much less than that of bacterial origin

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Dirt content is a large factor; in dirty milk the catalase content is higher than in clean milk. The catalase of cream remains largely in buttermilk. L. L. VAN SLYKE.

Remarks on Work of Kooper with Catalase Determinations. W. GRIMMER. *Milchwirtsch. Zentr.*, 2, 314–6.—A criticism of the work described in the preceding abstr. L. L. V. S.

Review of Literature of Dairy Chemistry for First Half of 1911. W. GRIMMER. *Milchwirtsch. Zentr.*, 2, 337–61. L. L. V. S.

Application of Cornalba's Rule of Constancy of Soluble Milk Constituents. H. HÖFT. Dairy Expt. Sta., Kiel. *Milchwirtsch. Zentr.*, 2, 361–4.—Cornalba called attention to the approx. constancy of the sol. constituents of milk (solids less fat and casein). H. applies the rule to the milk of cows in his country. In milk of individual cows, in which solids varied from 11.20 to 15.63%, fat from 2.74 to 5.64%, and casein from 2.14 to 4.57%, the sol. constituents varied from 5.28 to 6.78%. For the most part, the amt. of sol. constituents is near 6%, variations in most cases being only slight. The high figures are furnished by the milk of cows far along in lactation. L. L. VAN SLYKE.

Milk-flask Stoppers. SEIFFERT. Dairy Hygienic Exp. Sta. of Leipsic. *Milchwirtsch. Zentr.*, 2, 364–71.—A discussion of the history of the subject with some new suggestions. L. L. V. S.

Significance and Practical Value of Methods Most Used in Milk Investigations. H. LENZEN. Bact. Lab., Berlin. *Milchwirtsch. Zentr.*, 2, 377–8.—The following tests were studied: Acidity (Soxhlet-Henkel), reductase (methylene blue with and without formalin), peroxidase (Einhorn), diastase (Koning), leucocyte content (Trommsdorf), and the hemolytic power. The milk used came from the markets and dairies as well as from cows with diseased udders. *Results:* (1) High catalase content in fresh normal milk is a sign of diseased udder when the colostral period is over. In market milk, the catalase test is not useful as a diagnosis of pathogenic milk due to udder disease, since the action is one characteristic of many kinds of bacteria, which are normally present in milk, and therefore such milk under conditions favorable to bacterial growth may furnish a high catalase figure. The value given by Koning of 2.5 cc. O is too low; 4 cc. is nearer right. (2) The formalin-methylene-blue reductase test is not sufficient, taken by itself, for the diagnosis of mastitis. Bacterial decomp. in milks hastens somewhat the action of the test with methylene blue but only in slight degree when formalin is present also. On the contrary, mastitis hastens markedly the reaction in both cases. (3) The Koning diastase reaction is not adapted to detect mastitis. (4) The blue coloration appearing in raw milk with the peroxidase reaction of starch goes sooner or later into a rose-red color, according to acidity; while, in milk still in the incubation stage, the blue color remains permanent or changes gradually in the course of some hours. (5) Trommsdorf's test for leucocytes is not sufficient by itself to show the presence of mastitis. Pathogenic streptococci can generally be surely shown only by microscopic or culture tests. For ordinary market milk, a large sediment of yellow-white color awakens suspicion of the presence of milk from diseased udders. (6) Tuberculosis in udder is shown by neither catalase nor reductase tests. (7) Method based on increased hemolytic action of mastitis milk is not suitable for practical work. (8) Colostral milk during the first few days after parturition has a high acidity and a high catalase and diastase content. The formalin-methylene-blue reaction appears only slowly, and the peroxidase reaction less sharply than later. (9) None of the special, indirect reactions for the hygienic control of milk are reliable.
L. L. VAN SLYKE.

Proof of the Use of Alkali Carbonates in Cheese-making. H. HÖFT. Dairy

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Expt. Sta., Kiel. *Milchwirtsch. Zentr.*, 7, 25–31.—In making sour-milk cheese, $NaHCO_3$ is often used. The total ash content gives no satisfactory clue to the presence of added $NaHCO_3$, but the relation of water-sol. ash to insol. aids in detection, making direct detn. of alkalinity of water-sol. ash with methyl orange as indicator and the detn. of "true alkalinity" by Farnsteiner's method (sepn. of H_3PO_4 compds. by Ca salts in order to get sharp end reaction). In normal milk, the "true alkalinity" is under 1 (that is, 1 g. ash uses less than 1 cc. *N* acid). Addition of alkali increases this figure. L. L. Van Slyke.

Ripening of Cheese-factory Milk. Burri and Kürsteiner. *Landwirtschf. Jahrb. der Schweiz*, 1910, 437–66.—The action of lactic acid bacteria in relation to increasing acidity of milk, preliminary to the process of cheese-making, was studied. L. L. Van Slyke.

Milk and Dairy Investigations during Last Half of 1910. W. Grimmer. *Milchwirtsch. Zentr.*, 7, 49–70.—A review of literature. L. L. V. S.

Feeding Experiments with Suckling Pigs, Using Dried Potato Chips with and without Sugar. Klein. *Milchwirtsch. Zentr.*, 7, 70–4. L. L. V. S.

Biological and Biochemical Study of Pasteurization of Milk. C. J. Koning. *Pharm. Weekblad*, 1909; *Milchwirtsch. Zentr.*, 7, 97–118, 145–72.—A full discussion of the literature together with the results of a long-continued study, devoted particularly to various conditions influencing the number of bacteria and the amounts of enzymes. L. L. Van Slyke.

Control of Milk, Cheese and Butter in Chemistry in 1910. A. Behre. *Milchwirtsch. Zentr.*, 2, 402–11.—Results are given of analyses of several thousand samples of milk and milk products. L. L. Van Slyke.

Use of Sheep's Milk in Cheese-making. A. Burr and F. M. Berberich. *Milch-Ztg.*, 40, 95, 105, 125, 135 and 145.—A description of over 30 kinds of cheese made from sheep's milk in different countries. L. L. Van Slyke.

Composition of Cheese Made from Sheep's Milk. A. Burr and F. M. Berberich. *Milch-Ztg.*, 40, 195–205.—Detailed statement of % comp. of different kinds of sheep's-milk cheese, covering H_2O, fat, proteins, acidity, ash, salt. The cheeses are classified as "cream," "whole-milk," "fat," "half-fat," and "skim," according to the % of fat. L. L. Van Slyke.

Yogurt. C. Mumberg. *Milch-Ztg.*, 40, 137.—A discussion of different preps. and com. relations. L. L. V. S.

Manufacture of Cheese in Italian Alps. C. Gorini. *Milch-Ztg.*, 40, 226. L. L. V. S.

How Can the Fat Content of Cheese be Approximately Estimated from the Composition of Milk? Höft. *Milch-Ztg.*, 40, 248.—A statement of different ways in common use in Germany. L. L. V. S.

Manufacture of Grana and other Kinds of Cheese. C. Gorini. *Milch-Ztg.*, 40, 265. L. L. V. S.

History of Oriental Milk Beverages: Kefir, Kumiss, Yogurt. A. R. Erlbeck. *Milch-Ztg.*, 40, 275. L. L. V. S.

Is the Iron Content of Wash-water of Influence on Quality of Butter? W. D. Kooper. *Milch-Ztg.*, 40, 285.—When water contains less than 36 mg. Fe per 1000 cc. and is free from other constitutents, it does not affect butter. In butter made from sour cream containing Fe rust, the butter had a metallic taste and a marked grayish color with dark spots. L. L. Van Slyke.

Bacteriology of Butter. O. Jensen. *Milch-Ztg.*, 40, 295.—The sources and

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characteristics of different bacteria, especially those decomposing butter-fat, are discussed. The organisms grow more quickly in sweet, unsalted butter than in that made from acid ("ripened") cream. L. L. VAN SLYKE.

Behavior of Acidopresamigenic (Acidoproteolytic) Bacteria of Cheese at Low Temperatures, with Reference to their Intervention in the Ripening of Cheese. CONSTANTINO GORINI. Lab. batter. r. scuola sup. agric., Milano. *Atti accad. Lincei*, 20, II, 284–8.—The acidopresamigenic bacteria of cheese, especially some acidoproteolytic cocci, can develop at temps. even below 10°, and therefore, unlike lactic ferments proper, can function in cheese during the periods of "hibernation" of the latter in cold storage. The proteolytic enzymes of these bacteria can act below 5°, where microbic life in general is presumably arrested. This is in harmony with the modern American view of the possibility of ripening cheese in cold storage. To admit the influence of these bacteria in the various phases of ripening, it is not necessary to demonstrate their continued life in each phase; it is only necessary to show that they had a sufficiently luxuriant period of development in the initial phase; the intro- and extracellular enzymes generated by them provide for the continuation of their work.

CHAS. A. ROUILLER.

Nutritive Value of Buffalo and of Cow Milk (Chemical Studies). G. MAGINI. Lab. istol. fisiol. gen. r. univ. Roma. *Atti accad. Lincei*, 20, II, 267–73.—The following are the average results obtained for cow and buffalo milks, resp., in %: H_2O, 86.20–87.40, 81.25–81.58; solids, 13.80–12.60, 19.75–18.42; albuminoid substances, 3.48–3.56, 3.65–3.90; fats, 3.54–3.66, 8.20–8.28; lactose, 4.80–4.90, 5.06–5.20; salts, 0.70–0.80, 0.80–0.98; reaction, usually alk. (sometimes amphichroic), always alk.; d. 1.028–1.030, 1.0330–1.0335. A comparative table of the results obtained by various investigators is given; the author's results agree almost perfectly with those of König for cow's milk and Rimini's for buffalo's milk, confirming the fact that the latter has a much higher nutritive value. CHAS. A. ROUILLER.

Results from Two Daily Test Milkings of Six Cows. A Contribution to the Judging of Milk Adulteration. I. M. KRASSER. *Z. landw. Versuchsw.*, 14, 711–21.—There is no noteworthy difference in quantity or comp. in the morning and the evening milk, but in individual cases there were wide divergences in the comp., so that milk should not be condemned on the ground of a single test. P. A. YODER.

Experiments in the Production of Sanitary Milk. HORACE ATWOOD AND W. J. GIDDINGS. W. Va. Univ. Agri. Expt. Sta., *Bull.* 134.—The usual methods of washing the milk coolers are not satisfactory; they should be enclosed so they can be thoroughly steamed. A study of the relative number of bacteria in the diff. quarters of the udder is also included. H. S. BAILEY.

Determination of Casein in Milk. M. G. HALPHEN. *Mat. grasses*, 4, 2289–90.—A rapid method consists in detg. the total solids, fat and ash, as in the ordinary analysis; in a sep. portion pptg. the fat and casein, according to the official method, by adding 10 cc. of milk, drop by drop, to 25 cc. of alc. containing 0.1% AcOH, filtering, evapg. 20 cc. of the filtrate to constant wt., and ashing. The loss on ignition is the organic matter of the lactoserum. The casein is given by the formula: Total solids—(fat + ash + organic matter of lactoserum). C. R. BRAGDON.

The Action of Ozone on Milk and Dairy Products. E. WIENER. *Chem. Ztg.*, 35, 1112.—The unsatisfactory results of Freund's work are due to a too high conc. of O_3. By use of ozonized air of a conc. of 0.0003–0.0004 g. per l. pathogenic organisms are destroyed and the lactic acid bacilli reduced. The rapid passage of a current of air through the milk after the treatment with ozone is indispensable. In milk so treated no change in taste can be detected even after cooking. B. B. SCHNEIDER.

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Knotberry Oil. Its Detection in Olive Oil. SIRO GRIMALDI. *Staz. sper. agrar. ital.*, 44, 291–300.—Knotberry oil is a greenish yellow limpid oil possessing an agreeable odor similar to that of inferior olive oil; it is sol. in Et_2O, C_6H_6, $CHCl_3$, CS_2, CCl_4, and in equal vol. of b. 98% alc., but almost insol. in it at ord. temp. Constants: D_{15} 0.921–0.9225, n_{25} 62–63, Tortelli's thermic index 53–54, I no. 100–101 (relative), I no. of fatty acids 102.5–103.0 (absolute), sapon. no. of the oil, 192–192.5, sapon. no. of the fatty acids 195–195.5. Solid. point of oil beginning at 0° complete between —10 to —15° solid. point of fatty acid 29–31; m. p. of fatty acids 34–37°, unsapon. residue 0.2%. Olive oil has a lower d., thermal index, and I no. Knotberry oil gives an intense green color with acids, just as in the case with hempseed oil. Halphen's reaction is negative, so are Villavecchia's and Guarnieri's. To 50 cc. oil add 1 cc. of a 1% soln. of agar agar in HNO_3 (1.40), heat gradually to boil. Let stand a few minutes and cool. The oily layer becomes colored orange-red, while the acid remains straw-yellow. The orange-red color varies in intensity with the amt. of knotberry oil. J. A. LECLERC.

Lactarinic and Cetostearic Acid Obtained from Mushrooms (Lactarius). J. BOUGAULT AND C. CHARAUX. *Compt. rend.*, 153, 572–3.—Lactarinic acid was found in many species. It exists free and may be extracted with alc. boiling at 90°. The conc. ext. is exhausted with Et_2O in which the acid is sol.; m. 87°, insol. in H_2O, sol. in organic solvents. The alkali salts are only slightly sol. in cold, easily in hot H_2O. Analyses and mol. wt. gave formula $C_{18}H_{34}O_3$, a type of cetostearic acid. It forms an *oxime* m. 59–61°, and with Na in abs. alc. gives dihydrolactarinic acid, m. 83°. *Acetate*, m. 52–53°. Et lactarinate m. at 41°. Two other acids of this type are known with m. p. of 83° and 76°. D. S. PRATT.

The Determination of Water in Honey. U. FABRIS. Lab. d. Gabelle, Bologna. *Z. Nahr.-Genussm.*, 22, 353.—The method of drying for 5 hrs. at 100° *in vacuo* (1), and for 28 hrs. at 60° *in vacuo* (2), are compared with a distillation method (3), and with desiccation in a current of dry air (4). (3) Introduce 50 g. of honey and 200 cc. of turpentine into a 500 cc. flask and immerse the latter in an oil bath so that $^1/_3$ projects above the level of the oil. Connect the flask with an upright condenser and distil, collecting the distillate in a vessel shaped like a Hortvet tube, the lower constricted part being graduated. When 150 cc. have been distilled the water is allowed to sep. from the turpentine and collects in the graduated tube. (4) Use a special U-tube, one limb being 0.5 cm. in diam., the other flaring just above the bend into a cylinder 3 cm. in diam. This cylinder is fitted with a ground glass cap from which passes a tube (diam. 0.5 cm.) that constitutes the other end of the U-tube and to which can be attached a rubber tube for carrying off the air laden with the H_2O. Both ends of the U-tube are provided with glass cocks. A perforated porcelain disk is placed at the bottom of the cylinder, over this a layer of cotton, then a bundle of quills of filter paper, and another layer of cotton. The app. is heated in a water bath at 95°, and air dried by H_2SO_4 drawn through (4–5 bubbles per sec.) for 1 hr. The current of air is maintained while the U-tube cools, the stopcocks are closed, and the U-tube weighed. Ten cc. of a 25% soln. of honey are then evenly distributed over the contents of the cylinder, and the drying conducted as described above for 2½ hrs. The moisture results on 3 samples of honey by the 4 methods were: *A*, (1) 13.05, (2) 12.60, (3) 12.68, (4) 12.65%; *B*, (1) 18.72, (2) 18.25, (3) 18.30, (4) 18.32%; *C*, (1) 23.75, (2) 23.43, (3) 23.52, (4) 23.47%. A. F. SEEKER.

Analyses of Several Genuin Honeys. G. L. VOERMAN AND C. BAKKER. Imp. Bur. for Analysis of Merchandise, Leyden. *Chem. Weekblad*, 8, 784–90.—The following ranges of values were obtained for 42 samples of honey, mostly of domestic origin and known to be genuin: Water content, 17.7–23.7%; polarization in a 20 cm. tube before inversion, —1.5 to —4 (except 2 abnormally high samples); sucrose, below 5%;

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invert sugar, 70% and more; acidity as formic acid, 0.05–0.15%; ash, 0.1–0.55%; tannin pptn. according to Lund, 1–25 cc. The reaction with resorcinol–HCl for ω-methoxyfurfural, according to Fiehe, gave negative results. All but two of the samples gave a diastase reaction. P. A. YODER.

Chemical Preservatives. I. H. SERGER. *Chem. Ztg.*, 35, 1127–9.—A review of the literature on HCOH, its antiseptic and preservative qualities, and the qual. and quant. methods for its detection and estn. **II.** *Ibid.*, 1150–2.—A complete review of the literature on HF and fluorides, HCOOH and H_2O_2. Their preservative action, effect on health, and methods of detection and estn. are discussed. **III.** *Ibid.*, 1166–8.—The literature on boric acid, borax and salicylic acid is reviewed. **IV.** *Ibid.*, 1194–5.—BzOH and benzoates are discussed. P. B. DUNBAR.

Determination of the Quality of Gluten. J. ASPIT AND BROCQ-ROUSSEU. *Ann. sci. agron.*, 28, 81–6.—Description of a new app., called by the author, *ectasiograph*. The quality of gluten of wheat is affected by heating the grain up to 100° for 30 min. or 90° for 1 hr., or 80° for 3 hrs., or 75° for 20 hrs. The app. may be useful to measure the tenacity of substances similar to gluten. J. A. LECLERC.

MONVOISIN, A.: **Le lait, son analyse, son utilisation.** Paris: 12°, 286 pp., 5 Fr.

PARRY, E. J.: **Foods and Drugs.** 2 Vols. London: Scott, Greenwood & Co., 904 pp., $7.50.

PELLERIN, G.: **Préparation, fabrication et conservation des denrées alimentaires.** Paris: 8°, 524 pp., 17.50 Fr.

U. S., 1,004,033, Sept. 26. B. F. JOHNSON, Macclenny, Fla. **Preserving corn with the husk on,** by submerging in liquid pine tar at 60–70° and then successively submerging in dust and air-slaked lime.

U. S., 1,004,252, Sept. 26. J. T. HALL, Chicago, Ill. **Apparatus for preparing a meat-preservative** (from NaCl, salicylic acid and fumes from beechwood), comprizing a retort, a hollow shaft communicating with the retort, a cylinder journaled on the shaft and communicating with it, a shaft extending through the hollow shaft and a fan thereon for forcing fumes from the retort through the hollow shaft into the cylinder, and mixing mechanism in the latter.

U. S., 1,004,515, Sept. 26. J. WILLMANN, Derby, Conn. **Homogenizing cream repeatedly,** after preliminary pasteurizing if desired, to avoid the occurrence of curd in the final product, and then cooling.

U. S., 1,004,674, Oct. 3. J. H. MORRELL, Ottumwa, Iowa. **Protective and preservative coating for meats,** comprizing an inner wrapping of absorbent material, *e. g.*, paper, and an outer tight covering of textil material having a coating of marine jelly.

U. S., 1,004,870, Oct. 3. L. GREISER, Berlin, Ger. **Purifying cocoa** by grinding the cocoa beans at atm. pressure to form a pulp and heating the pulp in a vacuum pan to a temp. at which ebullition takes place until the moisture and deleterious vol. substances have been expelled.

U. S., 1,004,891, Oct. 3. T. MÖLLER, Eshjerg, Denmark. **Edible compound,** consisting of nucolin (nut fat) 100, glycerol 1 and dil. HOAc 2 parts.

U. S., 1,005,001, Oct. 3. J. D. DARLING, Philadelphia, Pa. **Making chewing-gum from pontianak rubber** by subjecting the crude material to a purifying process, heating the purified mass until it melts, adding a small % of H_2O to the melted mass and allowing it to cool and set.

U. S., 1,007,908, Nov. 7. O. L. AHRENS, Hamburg, Ger. **Preserving raw meat**

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by dipping it repeatedly into fat heated to about 200° and allowing the expelled H_2O to run off with the fat each time the meat is taken out of the hot fat, until the H_2O has been completely expelled from the outer layer of the meat, placing the meat into a vessel filled with hot fat, closing the latter air-tight and driving out the fat by a neutral gas.

U. S., 1,007,940, Nov. 7. F. M. GREGG, Cleveland, Ohio. **Drying edible pastes,** *e. g.*, macaroni, by alternately raising and lowering their temp. while maintained *in vacuo*, removing the moisture extd., and then maintaining the temp. without variation to complete the drying.

U. S., 1,008,730, Nov. 14. L. RODENHAUSEN, Philadelphia, Pa. **Adhesive for patching cigar wrappers,** composed of tobacco, sugar, H_2O and alc.

U. S., 1,008,920, Nov. 14. J. C. KNISS, Louisville, Ky. **Preparing foods** by comminuting dry ingredients, *e. g.*, beans or rice, mixing them together and pressing the dry mixture into friable cakes.

U. S., 1,009,325, Nov. 21. W. L. LODGE, Seattle, Wash. **Preserving fruit,** *e. g.*, apples, by immersing in a boiling soln. of sugar in H_2O and a small amt. of citric acid, until the fruit becomes transparent, and finally drying.

U. S., 1,009,610, Nov. 21. K. H. WIMMER, Bremen, Ger. **Decaffeineizing unbroken green coffee beans** by treating under a pressure of 0.5–4 atm. with acidulated H_2O at 70–120°, extracting with hot H_2O at 70–120°, sepg. the caffeine from the extract thus obtained, impregnating the coffee beans with the remaining ext. and finally drying and roasting them.

U. S., 1,009,650, Nov. 21. G. DELIUS and C. P. TATRO, Seattle, Wash. **Preserving meat** by first coating it with a mixt. of gelatin and glycerol, placing the coated meat in an ozonized atm. to congeal and dry the coating and finally overcoating with Na silicate.

Brit., 7,178, Mar. 22, 1911. SCHNEIDER JAGUET & CIE, Strassburg-Königshofen, Ger. In the **treatment of grain** by moistening and aerating, repeating the operation without delay.

Ger., 229,055, July 5, 1908. L. M. THOMAS, Wilhelmshaven. **Conditioning flour** and its by-products by intimately mixing them with air which is satd. with moisture.

Ger., 229,515, Nov. 30, 1909. A. SCHELLER, A. SCHREIBER, Halle a/S. **Molding machine for margarines** and similar masses.

Ger., 229,516, Dec. 7, 1909. ALTONAER MARGARINE WERKE MOHR & Co., Altona-Ottensen. Initial material for the production of **margarine** and similar emulsions.

Ger., 229,909, Apr. 2, 1908. AKT. MASCHINENBAU, ANSTALT VORM. VENULETH & ELLENBERGER, Darmstadt. **A food product from potatoes.** The potatoes are first steamed, then cut up and dried to 50% of their original contents of H_2O, and finally desiccated on a roller drying app. The resulting product consists of fine flakes.

14. WATER, SEWAGE AND SANITATION.

EDWARD BARTOW.

Water Supply. J. H. B. BROWNE. *Chem. News*, 104, 205–8, 215–8.—Lecture. E. J. C.

Artificial Ground Water. F. BRAIKOWICH. *Z. Ver. Gas Wasserfachmänner in Osterreich Ungarn*, 51, 368–71; through *Wasser und Abwasser*, 4, 447–8.—Frankfort

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a/Main pumps 132,000 gals. water from the Main upon an infiltration area to enrich the ground water supply. Offenbach a/M utilizes a similar project for the water from the old water works. Braunschweig permits not only the cultivation on the infiltration area, but also allows the condensed water from steam engins to reach it. The resulting ground water shows an increase in the temp. of only 0.4°. Similar schemes are utilized by the Ruhr water works, and at times at Neunkirchen, Austria.

ARTHUR LEDERER.

Modern Drinking Water Prophylaxis. A. BENCKE. Munich. *Gesundh. Ing.*, 34, 796–7.—The drinking water problem is more serious in U. S. than in Europe. A diagram in the article permits a comparison of typhoid fever rates in various American and European cities. ARTHUR LEDERER.

The Occurrence of a Supposed Undiscovered Coliform Organism in Drinking Water. G. N. HALL. *J. Roy. Inst. of Publ. Health*, 19, 359; *Wasser u. Abwasser*, 4, 463.—H. isolated a bacterium which ferments glucose with the formation of acid. The morphologic and culture characteristics are described. The bacterium is non-pathogenic to guinea pigs. ARTHUR LEDERER.

Sampling Water for Bacteriological Tests. F. D. WEST. *Eng. Record*, 64, 626.—This describes a sampling device, using 2 oz. salt-mouth bottles, the stopper being raised and lowered under water by a clamp and pull rod. A spring automatically closes the bottle. The weight is 5 lbs. for a rig 9 ft. long. LANGDON PEARSE.

Ozone and Water Purification. F. A. KRAFT. Milwaukee Health Depart., *Bull.* Oct., 1911, 2–5.—After describing plants using O_3, ozonization of water is recommended as preferable to filtration for the purification of the Milwaukee water supply.

E. BARTOW.

Ozone in Water Purification. *Times* (London); *Elec. Rev. West. Elec.*, 59, 895.—The de Frise ozonizing app. installed at St. Maur, France, consists of units formed of a grounded horizontal brass trough fitted with a plate glass cover from which are suspended at regular intervals half disks of brass with serrated edges. Air circulated through the troughs is ozonized by the silent elec. discharge across the 4 in. space between the disks and the trough under a pressure of 2000 v. The H_2O and ozonized air are brought together in vertical, enameled, Fe cylinders, divided into sections by celluloid sieves. The capacity of the works is stated to be 6,000,000 gal. a day at a cost of treatment of between 0.9–1.1 cents per 1000 gal. Installations at Chartes and at Nice, with caps. of 1,325,000 and 10,000,000 gal. a day, resp., employ the Otto system in which the ozonizer consists of a series of sheets of glass coated on alternate sides with tin foil and sepd. by narrow strips of insulating material which leaves an air space between each adjacent sheet. C. N. MOORE.

Misbranding of Whittle's Epsom Lithia-water. *Notice of Judgment* No. 1139, *Food and Drugs Act*, 1911.—Analysis showed the advertized ingredients to be incorrect. As the defendant had relied on analyses by 2 chemists and had not intentionally violated the law a minimum fine was entered. E. BARTOW.

Adulteration and Misbranding of Tate Spring Natural Mineral Water. *Notice of Judgment No.* 1140, *Food and Drugs Act*, 1911.—Analysis showed that the constituents given on the label were incorrect and that the water was impure. E. B.

The Advantages and Disadvantages of Reinforced Concrete Pipes. ROHLAND. *Das Wasser*, 1911, 329–30; *Wasser und Abwasser*, 4, 457–8; cf. *C. A.*, 5, 1177.—Coatings with tar or asphalt comps. are recommended for insulation. Concrete is attacked by acids, acid salts, Mg, S compds., and waters rich in CO_2. ARTHUR LEDERER.

Control of the Alexandria (Egypt) Water Supply for 1907-1910. E. GOTSCHLICH (Alexandria) AND H. BITTER (Cairo). *Gesundh. Ing.*, 34, 794–6.—The system is that

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of the Jewell rapid-filter type. Tables which accompany the article demonstrate its bacterial efficiency. An automatic alum mixing app. is used. During the 6 yrs. of operation it has not been necessary to replace the sand in the filters. The efficiency, so far as clarification and the retention of bacteria was concerned, has remained intact throughout the entire period. A. LEDERER.

The Water Supply of Szolnok. JOSEF VARGA. *Epitö Ipar, Budapest,* 1911, No. 22; *Wasser und Abwasser,* 4, 150.—The water is taken from the river Theiss, the turbidity of which necessitates sedimentation with the addition of 10% alum soln. When the river is low 90 lbs. of alum is added per mil. gals. When the river is high 180 lbs. are added. In the former case it takes 3–4 hrs., in the latter case 6–8 hrs. for clarification. The effluent goes onto sand filters. The beds need cleaning every 40–50 days. The cost of clarification and filtration is less than $38 per mil. gals.
ARTHUR LEDERER.

The Mechanical Filtration Plant at Minneapolis. *Eng. Record,* 64, 586–90.—The plant is of special design, interesting in flexibility of operation, the reduction in amt. of piping and the economy in handling and mixing chemicals ($(Al_2(SO_4)_3$, $Ca(OCl)_2$ and lime), 2 concrete mixers being used for mixing the lime. The automatic regulation of the chem. feed depends on the Venturi meters, and will be in exact ratio.
LANGDON PEARSE.

Operation of the Lakeside (O.) Filter Plant. C. P. HOOVER. *Eng. Record,* 64, 554–5.—The construction and operation of a mechanical filter is described. $Ca(OCl)_2$ is added to supplement the filters, in amts. of 0.25–0.35 parts per mil. available Cl. $Al_2(SO_4)_3$ (0.55 to 1.0 grain per gal.) was used. Bacterial investigations are detailed.
LANGDON PEARSE.

The Water Purification of the Public Bath (Row System). M. BOUSQUET. *Chauffage industries sanitaires,* 3, 129; *Wasser u. Abwasser,* 4, 449.—A description of the purification systems installed at the public baths of Bristol, Bury, and other cities (in Eng.). The water is lifted from its greatest depths and run on to trickling filters for aeration, then on to rapid filters of the Reisert system, and finally to a heating device and back to the basin. The purification is very efficient. In Bury the same water has been continuously used for several mos. with the result that merely the inorganic constituents (chlorides and sulfates) were found to be increased. The bacterial efficiency was likewise satisfactory. ARTHUR LEDERER.

Decomposition of Organic Matter in Water and Sewage. GEORGE W. FULLER. *Eng. Record,* 64, 563–4.—This is a concise summary of the opinions of W. R. Nichols and T. M. Drown, with particular reference to the decomp. in water. Anaerobic and aerobic decomp. are contrasted. The decomp. of sewage is thoroughly discussed, with analytical data from Lawrence and Gloversville. LANGDON PEARSE.

The Different Conditions of Sewage and their Causes. GEORGE W. FULLER. *Eng. Record,* 64, 579–600.—A very full discussion of the following topics: Fresh, stale and septic sewage, reduction of mineral sulfates, desulfurization, relation of bacteria to different compds. of S, residual results of decomp., and characteristics of decomp. products. LANGDON PEARSE.

Study of Carbon in Sewage and Sewage Purification. H. W. CLARK AND G. O. ADAMS. *J. Ind. Eng. Chem.,* 3, 738–42.—A summary of data obtained at the Lawrence Expt. Station, together with additional studies, all bearing upon C, N and O in sewage and its purification. W. F. LANGELIER.

Six Months' Financial Operating Results of the Garbage Reduction Plant at Columbus, O. ANON. *Eng. News,* 66, 505–6.—Results of the municipal garbage reduction plant for 6 mos. ending July 1, 1911, show the plant operated 155 days with an av.

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tonnage of 45.95 out of a total of 160 tons daily capacity. The grease recovered was 2.91% and tankage 10% of the green garbage. Receipts from grease, tankage and hides was $29,615.62 and expenditures $15,552.19, showing an apparent profit of $14,608.43. In such reduction by cities, actual profit is doubtful even in operation alone. A. L. GAMMAGE.

The Disposal of the Sewage of Chicago. GEORGE M. WISNER. Chief Eng. Chicago Sanitary District. Through *Eng. Record*, 64, 536–7.—The present scheme is a success. W. recommends that Emscher type of settling basins be constructed at various points, that discharge of industrial wastes and sewage disposal of towns be controlled by Sanitary Dist., a systematic exam. of water in tributaries of Ill. R., a federal dead line around all intakes, prosecution of captains of tugs negligent in carrying out spoil to proper distance, dumping of dredgings behind bulkheads, metering of water service and continuation of work of testing station. H. V. MAIN.

The Problem of the Main Drainage Canal at Chicago. G. M. WISNER. *Eng. Record*, 64, 558–60.—This is a summary of a report on the present condition of the canal and the remedy. The dilution of 3.3 cu. ft. per sec. per 1000 population is not enough under summer conditions to handle the load of industrial wastes. Sedimentation of Emscher tanks is recommended to remove the suspended matter. Sprinkling filters in the future will care for the increased pop. when sed. does not suffice.
LANGDON PEARSE.

Horsfall Refuse-destructor; Mersey Docks. ANON. *Engineering*, 92, 667–8.
E. J. C.

Trade Wastes—Tomato Canning. F. E. DANIELS. *Rept. N. J. State Board of Health*, 248–51.—Screening was not successful. An effluent that was stable for more than 3 or 4 hrs. could not be obtained by chem. pptn. with CaO, $FeSO_4$, $Ca_3(PO_4)_2$ clay, alum and combinations of these substances. Simple sedimentation gave an effluent almost free from turbidity but which required dilution to prevent putrescibility. E. BARTOW.

Treatment of Wool Washing Refuse. West Riding of Yorkshire Rivers Board, Wakefield, April 22, 1911. *Gesund. Ing.*, 34, 783.—The treatment of wool washing refuse at one factory is as follows: The sewage passes from a grit chamber into a basin where the fat is sepd. through the addition of H_2SO_4, then into a settling basin and finally onto a slag filter. These filters become clogged quite frequently. The final effluent still contains over 40 per cent. of the fat originally present. At another factory mentioned the process is similar, except that the waste reaches the river without passing through a slag filter. The final effluent contains but 17 per cent. of the fat originally present. Both of these purification systems are unsatisfactory. Better results were obtained by neutralizing the acid waste with lime and following it up with lime-iron sulfate coagulation. The still putrescible liquid was subjected further to biologic treatment. Such a filter purification, however, is very expensive.
ARTHUR LEDERER.

Formation of Oxidizing Agents in Air under the Influence of Ultraviolet Rays. V. G. KHLOPIN. Hyg. Lab. Women's Med. Inst., St. Petersburg. *J. Russ. Phys. Chem. Soc.*, 43, 554–61.—O_3, H_2O_2 and N_2O_3 are formed in the ordinary moist air of a room when subjected for a few min. to the action of ultraviolet light. The amt. of the first 2 is so considerable as to be detectable by chem. reagents. The app. used was a Westinghouse sterilizer for drinking water. H. M. GORDIN.

The Cleaning Efficiency or Sanitary Value of Vacuum Cleaners. W. D. FROST AND VERMILLION ARMSTRONG. Univ. of Wis. *J. Infect. Dis.*, 9, 265–75.—Gelatin adhesive disks made of 20% sterilized gelatin soln. are satisfactory for detg. the num-

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ber of bacteria on various surfaces, such as floors, furniture, etc. Thus the cleaning efficiency of vacuum cleaners was detd. The permanently installed systems are most efficient. The portables vary greatly, some being quite efficient, while others have little cleaning power and, due to escape of bacteria, may be dangerous.

H. J. CORPER.

U. S., 1,005,036, Oct. 3. T. H. HOOD, Greenville, Miss. **Disinfecting books** by spreading or opening and fluttering the leaves of the books by a current of air mixed with a disinfecting gas.

Ger., 282,956, Jan. 12, 1909. K. T. SCHULTHEIS, Darmstadt. App. for **removing oil from steam, air, or gas,** consisting in a reservoir provided with inlet and outlet openings and a hollow body arranged in the interior, filled with filtering material.

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15. SOILS AND FERTILIZERS.

F. P. VEITCH.

Soil Acidity and its Significance for Soil Cultivation. N. SOLENOW. *Diss. Jena.*, 1909, 68 pp.—A general presentation of the nature of the acids in the soil, their effect on the germination of seeds and the growing of plants. The number of bacteria in acid soils is small, while fungi are numerous. The difficulty sol. humic acids also act deleteriously, as they liberate the toxic mineral acids. Discussion of the methods of detg. soil acidity and an improvement of the method of Tacke and Süchting.

H. A. SPOEHR.

Nitrogen Binding and Dentrification. LEONHARD FELSINGER. Vienna. *Z. landw. Versuchsw.*, 14, 1039–1102.—The accumulation or the loss of N and its transformation into proteins was studied by means of a series of bacterial cultures with varying amts. of N as nitrates, nitrites, NH_3 and natural manures. Series I: Dextrose was added to the nutrient soln. Series II (natural manures and green manures): Straw was added when a higher proportion of carbonaceous matter was wanted. The cultures were inoculated with small portions of soil, without any attempt at pure cultures. Beginning in a series with a low proportion of N and using successively more N, 4 significant or limiting ratios were noted. With a very low proportion of N, there is a binding of atm. N. When the proportion of N to carbonaceous matter has reached a certain magnitude (Ratio I), then the N absorption comes to a standstill. Above this there is a range (designated Ratio II) through which some N is being lost to the atm. while increasing amts. are being transformed into proteins. With more available N (Ratio III), the protein content comes to a standstill. Finally with still more N (Ratio IV), the nitrate (or nitrite or NH_3) N content again comes to a standstill, probably due to a nitrifying fermentation of proteins equalling the N consumption. These ratios were detd. for nutrient solns. with pure chemicals, but in mixts. of natural manures it was more complicated and less regular due to non-availability of part of the N and C. Whatever the proportion of N in such a system, there is a tendency toward Ratio II as the equil. condition.

P. A. YODER.

Western Phosphate Deposits. ANON. *Eng. Mining J.*, 92, 1002.

ROBERT KANN.

The Cause of the Curly Leaf Disease of the Potato and the Possibility of Communicating the Disease through the Seed Potatoes and the Soil. G. KÖCK AND K. KORNAUTH. *Z. landw. Versuchsw.*, 14, 759–805.—The ash content of the tubers is higher but that

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there is no certain difference in the enzyme content or the distribution of the starch and sugar. P. A. YODER.

Nitrogen Fixation (LIPMAN). 11 C.

CHANCRIN, E.: **Chimie générale appliquée a l'agriculture.** 3rd Ed. Paris: 12°, 296 pp.

U. S., 1,007,682, Nov. 7. C. ELLIS, Montclair, N. J. **Insecticidal and fungicidal spray** containing underneutralized K rosin soap and finely divided As sulfide.

Ger., 229,598, June 6, 1909. G. HÖNNICKE, Berlin. App. for **cutting up and utilizing animal bodies** with fixed horizontal outer cylinder and sifting drum arranged therein. The drum has 2 oppositly running worms which shove the goods into the center of the app., where the outer cylinder at its deepest point is provided with an exit. The 2 worms run either close together or with an intervening space in the center. In a suitable position with respect to the worm screws, is arranged an Fe sheet operating as distributer and scraper. The outer cylinder alone or the outer cylinder and the sifting drum can also have the form of a double cone and then the worm screws and the scraper fit into this. The cylinder has a feed hopper with a cover. An opening to be closed by a perforated door in the sieve drum permits the filling of the drum after the opening is turned under the hopper.

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16. FERMENTED AND DISTILLED LIQUORS.

ROBERT WAHL.

Yeast, its Activity and Treatment in the Brewery and the Theoretical Grounds of the Nathan Brewing Process. L. NATHAN. *Chem. Ztg.*, 35, 1168–9.—N. discusses the difficulties in obtaining a uniform and steril product under present conditions and claims as the basic feature of his process agitation of the yeast cells which results in more vigorous fermentation. The CO_2 and air used for agitation in passing through the wort frees the same of those volatil substances which impart to it the "young" smell and taste. The wort is cooled in closed Al vessels and then forced into Al vessels previously sterilized with alc. vapors, and yeast is added. In the beginning the wort is agitated by means of CO_2 every hr. The CO_2 developed during fermentation is collected, purified and stored for future use. The hop resins are deposited on the walls of the Hansena app. As soon as a break is visible the vessel with conical bottom is vigorously cooled off at the apex whereupon the yeast falls to the bottom and is pumped back into the starting tub. Air is now passed in to start a vigorous fermentation and the beer washed with CO_2 until the "young" smell has disappeared. It is then cooled to 0° and satd. with CO_2. The entire process is carried out in a steril manner and lasts from 8–10 days. C. A. NOWAK.

The Production of Zymase from Fresh Brewery Yeast through Plasmolysis. P. RINCKLEBEN. *Chem. Ztg.*, 35, 1149–50.—Experimental verification and further research by the author along the lines of work of A. Lebedev (cf. *C. A.*, 5, 1292, 2394) and of E. Kayser (cf. *C. A.*, 5, 2144). C. A. N.

Determination of Dextrin in Beer. E. POZZI-ESCOT. *Bull. assoc. chim. sucr. dis.*, 29, 72–3.—The difficulty of filtering the alk. ppt. of dextrin in the ordinary method is overcome by the following modification: 50 cc. beer are conc. in a tared glass tube to 4 or 5 cc., alc. is added slowly, with shaking (100 cc. in all), and the mixt. centrif-

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ugalized. The alc. is then decanted off, ppt. redissolved, repptd. and again centrifugalized. The ppt. is then washed with ether or acetone and dried and weighed in the tube. The N detn. can be begun in the same tube by treating the ppt. directly with fuming H_2SO_4. WM. E. CROSS.

The Determination of Albumin in Wort. W. WUEST. *Z. ges. Brauw.*, 497–9.—Depending upon the method of evapn. used in preparing beers and worts for N detns. the results show variations in albumin content. For exact work, W. recommends an addition of from 4 to 5 cc. conc. H_2SO_4 and a temp. of from 100 to 120°. C. A. N.

The Determination of the Enzymic Power of Malt. E. MOUFANG AND A. SCHERER. *Wochschr. Brau.*, **28**, 525–9.—Expts. lead to the following conclusions: (1) The conception "enzymic power" of a malt is not identical with "diastatic power" of the malt, and does not correspond to the highest yield to be obtained from a malt. (2) From a knowledge of the diastatic power valuable conclusions as to methods to be employed in brewing can be drawn. (3) In a similar manner numerical values can be arrived at which will admit direct comparison of the degree of solubility of various malts. As an "over dissolved malt" the authors suggest designating a malt which after 90% of its total enzyme content has been destroyed is still able to completely split up starch and albumin, both qualitatively and quantitatively, so that the yield does not exceed 0.5%. In similar manner standards can be established for other types of malts. (5) In judging the complete splitting up of the starch and albumin the quant. and qual. comp. of the wort must be taken into consideration. C. A. N.

The Importation of Spanish Wines. A. WINGLER. Chem. Untersuchsamts Stadt Konstanz. *Z. Nahr. Genussm.*, **22**, 358–60.—A brief account of the comp. of Panadé's wines, the grape districts from whence they come and the methods of manuf. The analyses of 2 standard white wines of undoubted purity and of 29 com. white and 4 com. rosé Panadé's wines are given. They have low alc. (7–8 g. per 100 cc.), very low ext. (av. 1.8 g. per 100 cc.), but high ash (usually over 0.2 g. per 100 cc.). They are agreeably acid. Some of the com. samples were found to have both ext. and ash greatly below the average and were regarded as suspicious. The wines were all strongly sulfured. E. L. P. TREUTHARDT.

The Economic Use of Coal in the Brewing Industry. S. O. NEVILLE. *Chem. News*, **102**, 209. J. J. M.

Intermediary Product of Alcohol Fermentation (EULER, FODOR). **11 C.** Cooling and the Schardinger Reaction (RURRI, SCHMID). **11 B.**

FONTAINE, E.: **Manuel du chimiste brasseur.** Paris: 224 pp., 5 Fr.

U. S., Reissue 13,315, Nov. 14. R. WAHL, Chicago, Ill. Original Pat., No. 979,810 (*C. A.*, **5**, 961). **Carbonated hopped extract of malt containing the products of lactic acid acidulation to the exclusion of most other products of fermentation;** made by mashing malt, inoculating the resulting wort with lactic acid bacteria and maintaining it at about 46–55° to promote the fermenting action of the lactic acid bacteria and prevent practically all other fermentation and then hopping and carbonating.

U. S., 1,004,885, Oct. 3. C. H. LOEW, Lakewood, Ohio. **Pasteurizing bottled beer, etc.,** by passing through a continuous field of spray having spaced portions of different temps. evenly graduated.

U. S., 1,007,967, Nov. 7. F. PAMPE, Halle-on-the-Saale, Ger. In distilling

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alcoholic liquids, heating a confined current of fermented liquid, maintained under pressure by the heat of concentrated alcoholic vapors, releasing the pressure on the liquid out of contact with the vapors and spreading the liquid out in thin layers to permit evolution of contained gas and low b. impurities.

17. PHARMACEUTICAL CHEMISTRY.

VIRGIL COBLENTZ.

A Cerium-Thorium Preparation for Röntgen Diagnosis and as a Therapeutic Agent in Stomach and Intestinal Diseases. E. GRUNMACH. Röntgen Ray Inst., Univ. Berlin. *Intern. Beitr. Path. Thérap.*, 3, 228–32.—A Ce-Th prep. (oxides) was used instead of $Bi_2(CO_3)_3$. The amt. used to produce satisfactory results was about 33% compared to the wt. of $Bi_2(CO_3)_3$. In addition to its diagnostic value, it acted as a medicant, healing diseases of the digestive organs. C. A. BRAUTLECHT.

Analysis of Hemoglobin Preparations. L. LUTZ. *Bull. sci. pharmacolog.*, 18, 132–8.—A brief outline of methods for 15 different detns. applicable to com. hemoglobin preps. V. K. CHESNUT.

Codex Criticisms—Simple Sirup. A. BOUTRON. *Bull. sci. pharmacolog.*, 18, 158–60.—The codex should require in the process of inversion that 2 cc. of 10% H_2SO_4 be used and that the b. be prolonged for about 5 min. The sirup made with cold H_2O suffers no loss in rotatory power in 6 mos. while that made with hot H_2O is partly inverted at once and suffers further loss on standing. V. K. C.

Black Antimony. A. MCGILL. Inland Rev. Dept., Canada, *Bull.* 225.—Of 77 samples collected in Canada, 21 contained no Sb, 9 contained over 50% of foreign matter, 8 had more than 5% of a residue insol. in HCl and 39 were essentially pure. V. K. CHESNUT.

Review in the Field of Ethereal Oils and Perfumes. F. ROCHUSSEN. *Z. angew. Chem.*, 24, 2185–95. E. J. C.

The Assay of Jalap. H. NORTH. *Am. J. Pharm.*, 83, 515–7.—Ten g. finely powd. jalap are moistened with 3 cc. H_2O, 51 cc. EtOH added and boiled 1 hr. with a reflux; the mixt. is percolated through cotton, conc. to 10 cc., treated twice with hot H_2O, the resin dissolved in EtOH and weighed after evapg. the solvent. H. C. FULLER.

The Assay Processes of the U. S. P. A. R. L. DOHME AND H. ENGELHARDT. *Am. J. Pharm.*, 83, 517–25.—The aliquot method gives more accurate results than the percolation and the latter is tedious when using as fine a powder as prescribed. Simple menstrua should be used for the final shaking out, mixed Et_2O and $CHCl_3$ can be used with advantage for extracting, and the drug should stand 1/4 hr. in contact with the menstruum before adding NH_4OH. With aconite, Na_2CO_3 or $NaHCO_3$ should be used instead of NH_4OH and the wording should be changed to "0.5% ether-sol. alkaloids." The acidity test for H_2O_2 should be revized, the present method does not destroy all the H_2O_2. The Fromme process for detg. the alkaloids in cinchona gives better results than the present method or that proposed in the revision. The standard for nux vomica should be based on the total alkaloids and not on the detn. of strychnine as the method is unreliable and incorrect. The eggs used in assaying pepsin should not be over 10 days old, and it is suggested that dry albumin might be substituted. Accurate results may be obtained with physostigma by dissolving the ext. in dil. EtOH, adding $NaHCO_3$ and shaking out with Et_2O. H. C. F.

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The Cultivation of Medicinal Plants at the University of Minnesota. E. L. NEWCOMB. *Am. J. Pharm.*, 83, 526–33. H. C. FULLER.

Spermin Preparations and their Composition. J. KUPZIS AND AUFRECHT. *Chem. Ztg.*, 35, 848.—Results of analyses of several spermin preps. reported by Aufrecht (*C.*, *A.*, 5, 2901) are criticized by Kupzis who states, that "Testiculin", being an aq. prep., is free from alc. and cannot hold 0.4% of oil of peppermint. Poehl's "Spermin" is no more than an ext. like the rest of such preps. since it was found to contain 0.11% of organic acids (lactic) and 0.031% of H_3PO_4. A. VORISEK.

Solvent Power of Aqueous Solutions of Boric Acid and Glycerol for Alkaloids. E. BARONI AND O. BERLINETTO. *Giorn. farm. chim.*, 60, 193–5 (1911); through *Chem. Zentr.*, 1911, II, 93–4.—An aq. soln. of 3 g. of H_3BO_3 and 50 g. of glycerol per 100 cc. is proposed as a solvent for alkaloids. The solvent action of the soln. increases with the proportion of H_3BO_3. Thus a 7.65% soln. dissolves 20% and a 15.3% soln., 40% of quinine. To make a 15% soln. of veratrine a 5% soln. of H_3BO_3 is required. The authors mixed the alkaloid with the H_3BO_3 and then added the H_2O and glycerol. The solubility in H_2O and in the proposed solvent, resp., are as follows: Codeine, 1 : 60, 4%; atropine 1 : 200, 10%; cocaine 1 : 700, 8%; morphine 1 : 1000, 5.5%; strychnine 1 : 7000, 3.5%; esserine, traces, 7.5%; veratrine, traces, 6%. A. V.

Composition of the Essential Oil of Myrcia gale, L. S. S. PICKLES. *J. Chem. Soc.*, 99, 1764–8.—From the shrub known as "bay bush" was obtained, by steam distillation, an oil of pale yellow color, odor sage-like, somewhat camphoraceous. On standing or when diluted with alc. it deposited colorless, shining, leafy crystals. Consts. of the oil from the leaves, leaves and twigs, and brush, resp., are as follows: Yield, 0.203, 0.076, 0.045; d_{15}, 0.912, 0.915, 0.8984 (25°); $(\alpha)_D$ 100 mm., —11.26°, —5.17°, —5.16°; acid no., 4.0, 7.0, 3.48; sapon. no. (total), 23.2, 31.7, 17.98; ester no., 19.2, 24.7, 14.50; sapon. no. of acetylated oil, 56.4, ——, 50.23. For identification of the constituents the oil from the leaves was used. The solid material of which 0.75% was obtained on cooling, consisted of a paraffin hydrocarbon, m. 63–4°, of the probable formula, $C_{29}H_{60}$. There were found 2.5% of free fatty acids (palmitic chiefly), terpenes including dipentene, cineole, esters of fatty acids, alcs. of high b. p., and sesquiterpenes. A. V.

Laboratory Studies of Pepsin, Pancreatin and Combinations of these Enzymes. A. ZIMMERMANN. *J. Ind. Eng. Chem.*, 3, 750–3.—Pepsin is destroyed in alk. solns. Pancreatin has been kept in acid solns. for 3 yrs. without loss of activity, the acidity being below 0.075% HCl. It converts starch best in slightly acid medium. Pepsin and pancreatin exercize no destructive function upon one another in solns. of the proper degree of acidity. They can be administered together; the acid of the gastric juice in the stomach combines with the proteins (of food) and is not destructive to pancreatin. It is believed that ptyalin is also active in the stomach for similar reason. A. V.

Estimation of Morphine by Extraction with Phenyl Ethyl Alcohol. A. D. THORBURN. *J. Ind. Eng. Chem.*, 3, 754–6.—An aq. soln. containing morphine is made alk. and shaken out with the alc. and benzene mixt., 3 : 1, which dissolves it. The ext. is partly evapd. and the alkaloid titrated residually. The method is designed for quantities of sample containing less than 0.175 g. of the anhydrous alkaloid, and consumes about 4 hrs. A. V.

The Ash Content of Capsicum. H. E. SINDALL. *J. Ind. Eng. Chem.*, 3, 753–4.—Ashed by the A. O. A. C. method, a large no. of samples of capsicum ranged in total ash from 5.44 to 9.37%, ash insol. in HCl being 0.52–1.83%. The U. S. standard of 6.5% and 0.5% should be changed to 7.0% and 1.0% resp. A. V.

Note on Determination of Specific Gravity of Ethyl Ether, U. S. P. G. D. ROSEN-

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GARTEN. *J. Ind. Eng. Chem.*, 3, 872.—A calibrated, 25 cc. pycnometer is used. The ether is brought to 25° by placing the pycnom. in 1 l. of H_2O kept at that temp., and the vol. adjusted by a capillary pipet. Results are within 2 points in the 4th decimal place. A. V.

Camphor Production in German East Africa. LOMMEL. Leipziger Neuste Nachrichten. *Board of Trade J.*, June 15, 1911; through *J. Soc. Chem. Ind.*, 30, 831.—A successful attempt to grow camphor at Amani is reported. The practice of obtaining camphor from the leaves of the tree without the tree being cut down has been found successful. A. V.

Ladanum. J. C. UMNEY. *Perf. Ess. Oil Record*, 2, 149.—Extraction of the plant yielding ladanum with various solvents was tried. The yield with petroleum ether was 14.93%, with acetone 14.78%; the odor of the latter is preferred though the petroleum ether ext. has been prepared by others in state of purity. A. V.

Further Note on Spanish Ladanum. E. M. HOLMES. *Perf. Ess. Oil Record*, 2, 155–6; *C. A.*, 5, 2902.—In Spain occur 16 species of *Cistus*, at least 4 of which have been called *C. ladaniferus* by botanists. Remarks are made on the distinctive characters of the true species used in Spain for the extraction of ladanum. A. V.

Citronella Oil: Proposed Standards. J. C. UMNEY. *Perf. Ess. Oil Record*, 2, 172.—As the result of exam. of Ceylon citronella oil by a number of analysts, the proposed standard is: $d_{15.5}$ —0.898–0.910, $[\alpha]_D$ —7 to —13°, acidity, as AcOH, not above 0.2%, acetylizable constituents, as geraniol, at least 58%; sol. in 80% alc. 2–3 vols., and clearing on diln. to 10 vols. *Estn. of Geraniol:* Ten cc. of the oil, 15 cc. of Ac_2O (95% and free from higher homologs) and 1 g. of anhydrous $NaC_2H_3O_2$ are boiled under a return condenser and after cooling, 50 cc. of H_2O slowly added through the condenser tube. The contents are heated at 70° for 20 min., poured into a separatory funnel, washed with a cold, neutral soln. of NaCl until sol. acids are removed, then dried with anhydrous Na_2SO_4. For sapon. 2–5 g. are heated with 0.5 *N* KOH (alc.) as usual, the excess of the alkali titrated with 0.5 *N* acid. A. V.

The Estimation of "Geraniol" in Java Citronella Oil. T. H. DURRANS. *Perf. Ess. Oil Record*, 2, 201–2.—The standard method for "geraniol" in Citronella oil (preceding abst.) fails to give a true geraniol content of Java oil which averages 90% as against 60% for Ceylon oils. The amt. of acetylating agents must be increased, the esterification prolonged over 2 hrs. causes a drop in apparent "geraniol," and a large excess of alkali must be used for sapon. To make the standard method applicable to both oils, these alterations are proposed: For 10 cc. of oil use 20 cc. 95% Ac_2O and 3 g. NaOAc. Proceed as directed and after adding 50 cc. of water, heat 15 min. on steam bath with condenser attached. Washing with NaCl soln. is to be followed with a cold, 1% Na_2CO_3 soln. until acidity is completely removed, and then with water. For sapon. use 50 cc. *N* KOH (alc.) heating 2 hrs. under return condenser and titrate excess of KOH with *N* acid and phenolph. A. V.

Oil of Spearmint. E. H. HOLMES. *Perf. Ess. Oil Record*, 2, 197–9.—Oil from *Mentha viridis* cultivated in New Jersey, U. S. A., had a different odor, recalling that of carvone, than the com. oil. Its d_{15} = 0.98; of the com. oil 0.92–0.94. The German oil is obtained from *Mentha crispa* and scarcely differs from the American product. The Russian oil, d_{15} 0.88–0.89, is distilled from *M. aquatica*. It contains only 5–10% of carvone, but 50–60% of *l*-linaloöl is found in it. Other species in which spearmint odor occurs are: *M. sylvestris* with the varieties: *nemorosa, mollissima, longifolia*; *M. alopecuroides, M. cardiaca, M. javanica* Benth. probably a form of arvensis, some forms of *M. canadensis*, and in *Tanacetum balsamita*, Compositae. A. V.

Japanese Peppermint Oil in the German Colonies. ANON. *Perf. Ess. Oil Record*,

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2, 199.—Oil from the plants cultivated in Oka-Landja, German S. W. Africa, gave: d_{15} 0.903, congealing point +20°, $[\alpha]_D$ —35°, acid no. 2.99, ester no. 4.68, acetyl ester no. 304.8, total menthol 84.83%, of which 1.3% were combined and 83.53% free. A. V.

The Adulteration of Lemon Oil. E. J. PARRY. *Perf. Ess. Oil Record*, 2, 209-10.—Samples of lemon oil were found abnormally low in optical rotation and deficient in citral (3.3–4.1%). On fractionation the [α] fell to +46° and on refractionation to +40° 30′. The nitrosochloride test (*C. A.*, 5, 2900) was obtained indicating the presence of a pinene form of adulterant. In Sicily the turpentine from *Pinus balapensis* known as "Greek turpentine" is used to adulterate lemon oil. From its $[\alpha]_D$ +37° and other values of the genuin "Greek turpentine," conclusion is made that the samples in question had 10–35% of that turpentine added. A. V.

The So-called Substitute Preparations. O. HÜBNER. *Z. angew. Chem.*, 24, 1393-8.—Every addition of a new product of value to materia medica is followed by the appearance in the market of a host of substitutes advertized as "equally good" or even as "chemically identical." For compilation of analytical data concerning the materials used as substitutes for the more common new remedies, the current literature has been collated and is extensively quoted. A. V.

The Need of Investigation of Pharmaceutical Preparations in Chemical Laboratories. E. SEEL. *Z. angew. Chem.*, 24, 1997–2006, 2054-9.—The results of analyses of 50 patent or official preps., among them some prepared in pharmacies, are enumerated and commented on. Of these, 50% were reported adulterated or impure. A strong plea is made to have medicinal agents analyzed—some physiologically tested—in properly equipped chem. labs. A. V.

Determination of Nicotine in Tobacco Extracts. W. KOENIG. *Chem. Ztg.*, 35, 1047–8; cf. *C. A.*, 5, 2876.—Contrary to Tóth, (*C. A.*, 5, 3707) the author has had no difficulty in detg. nicotine polarimetrically in tobacco exts. The sp. rotation of purest 1 nicotine prep. according to Ratz (*Monatsh.*, 1905, 1241–52) according to unpublished researches is 174° in benzene, 177° in toluene, and 181° in xylene. The values 167° in benzene, 170° in toluene, and 173° in xylene are recommended in calcs. for reasons to be given in a later work. For per cents. of nicotine below 10 the correction formula for vol. of nicotine need not be applied if the lower sp. rotation values of 164.4° with benzene, 167.2° with toluene, or 170.2° with xylene are used. The optical method of v. Degrazia gives low results on account of the high values for the sp. rotation of nicotine; while the volumetric methods of Tóth, Kissling and Ulex give high results, due to the titration of substances in tobacco other than nicotine.

E. L. P. TREUTHARDT.

Determination of Resorcinol (PENCE). 7. Constituents of Ethereal Oils (SEMMLER, SCHOSSBERGER). 10.

RABOW, S.: **Die neuesten Arzneimittel und Spezialitäten.** Strassburg: L. Benst, 8°, 4 M.

SCHMIDT, E.: **Ausführliches Lehrbuch der pharmazeutischen Chemie.** 5 Aufl., 2 Bd. Braunschweig: F. Vieweg & Sohn, 30 M.

U. S., Reissue 13,304, Oct. 31. W. NEELMEIER, Leverkusen, Ger. **Aminobenzoylaminobenzoyl-2-amino-5-naphthol-7-sulfonic acid;** (see U. S. Pat., No. 994,420, *C. A.*, 5, 2564).

U. S., 1,004,499, Sept. 26. R. TAMBACH, Ludwigshafen-on-the-Rhine, Ger.

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Assignor to Knoll & Co., same place. **Extract of ergot,** prepared by neutralizing and concg. an aq. extract of the drug, adding alc. and ether as long as a ppt. is formed, filtering the liquid from the ppt., concg. by evapn., adding milk sugar and drying. The product is a grayish white powder, almost insol. in alc., ether and petroleum spirit, easily sol. in H_2O, the aq. soln. yielding with iodized-NaI soln. a slight ppt., but when acidulated a strong brown ppt., with Hg iodide in acidulated soln. a whitish ppt., with picric acid a slight ppt. sol. in NH_4OH with a red coloration, with $AgNO_3$ soln. a whitish yellow ppt. sol. in NH_4OH with a red coloration, with Br water a white gelatinous ppt., with $FeCl_3$ soln. a ppt. sol. in NH_4OH with Bordeaux color, with $CuSO_4$ a grayish ppt. sol. in NH_4OH with a red color and on acidulation forming a gelatinous mass.

U. S., 1,005,076, Oct. 3. W. SCHULTZ, Charlottenburg, Ger. **Making a bacterial product for use in diagnosis** and as a remedy, by sepg. pure cultures of tubercle bacilli from nutritive meat juice, washing the bacilli with sterilized H_2O, shaking up with a PhOH soln., filtering off the bacilli, adding an Fe compd., *e. g.*, oxychloride, washing the ppt. and dissolving it in dil. NaOH. The product contains bacterial-albumin combined with Fe, the presence of the latter not being detectable immediately by means of $Fe_4FeC_6N_6$ and NH_4 rhodanide but only after acidifying with HCl.

U. S., 1,005,077, Oct. 3. *Idem.* **Obtaining a bacterial diagnostic and remedial preparation,** by evapg. a pure culture, *e. g.*, of tubercle bacilli, with the culture medium, filtering to remove the bacilli mass, adding an Fe compd., *e. g.*, oxychloride, washing the ppt. and dissolving it in NaOH soln.

U. S., 1,005,137, Oct. 10. A. D. BARR, Batesville, Ark. **Intestinal antiseptic** containing approx. 73.11% quinine and 26.89% mononitrophenol, almost insol. in H_2O or dil. acids; made by heating quinine and H_2O to about 100°, adding mononitrophenol when part of the quinine is in soln. and stirring the mixt. until combination is effected.

U. S., 1,009,428, Nov. 21. J. MACKAYE, Cambridge, Mass. **Apparatus for producing chlorides of carbon,** comprizing a mixing chamber filled with porous material, *e. g.*, powdered coke, connections for supplying CH_4 and Cl in desired proportions to the mixing chamber, a reaction chamber filled with porous material and means for heating and cooling the reaction chamber and for sepg. the reaction products.

Brit., 6,076, Mar. 10, 1911. SOC. CHIM. DES USINES DU RHONE, 6 rue Pigalle (9E) Paris, France. In the manuf. of **nitrophenylnitromethanes,** their homologs or derivs., the treatment of nitrotoluenes, their homologs or derivs., with moderately strong or strong HNO_3 under such conditions that the possibility is provided of counteracting the diln. of the acid which is unavoidable during the reaction.

Brit., 7,204, Mar. 22, 1911. FARBWERKE VORM. M. L. & B., Höchst a/M. Mfg. **salts of dimethylphenylbenzylammoniumdisulfonic acid** by treating with a methyl halide or dimethyl sulfate a salt of the methylbenzylanilinodisulfonic acid which is obtained by sulfonating methylbenzylaniline.

18. ACIDS, ALKALIES, SALTS AND SUNDRIES.

T. LYNTON BRIGGS.

The Position of the Ammonium Sulfate Industry in Germany. ANON. *Chem. Ind.*, 34, 459. C. A. COLE.

Balance of Courses in Chemical Engineering. CHARLES H. BENJAMIN. *Chem. Eng.*, 14, 739. J. J. M.

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A Model Laboratory for Practical Work in the Testing of Materials. ANON. *Stahl u. Eisen*, 31, 1624–30; cf. *C. A.*, 6, 139.—Many detail drawings of the equipment of Fried Krupp lab. at Essen are given. E. J. WITZEMANN.

DUNCAN, R. K.: **Some Chemical Problems of To-day.** New York: Harper, 253 pp., $2.00.

JOLY, H.: **Technisches Auskunftsbuch für das Jahr 1912.** Leipzig: K. F. Köhler, 8 M.

U. S., 1,003,983, Sept. 26. G. M. CALLAHAN, Jersey Shore, Pa. **Cooling composition for journal boxes, etc.,** consisting of emery dust 6, graphite 24, soap 35 and tallow 35 parts.

U. S., 1,004,027, Sept. 26. R. HOLTKOTT, Bedburg, Ger. **Making variegated linerusta** by feeding differently colored masses of linerusta comp. side by side to and through calendering and embossing rollers, removing in the form of narrow strips a part of the paste pressed on the fabric foundation at the points where the differently colored strips meet one another and in-pressing the board so that the edges of the strips come together.

U. S., 1,004,361, Sept. 26. J. BUEB, Dessau, Ger. **Making ammonium carbonate** from gaseous NH_3, CO_2 and steam, by passing the CO_2 through hot H_2O to preheat it, passing the NH_3 also through hot H_2O to preheat it and allowing the gases and steam to react upon each other.

U. S., 1,004,847, Oct. 3. L. S. BRACH, New York, N. Y. **Homogeneous paste for use in joining metallic surfaces,** comprizing $ZnCl_2$ 20 in soln. in H_2O 10 parts, refined petrolatum 30, crude petrolatum 35, rosin 5 parts and powdered Sn and Pb in the proportion of 1 part of the metal to 3 parts of the other materials.

U. S., 1,004,858, Oct. 3. H. H. DOW, Midland, Mich. **Producing crystals from an impure solution,** *e. g.*, of NaCl, by passing the soln. in succession through a series of evapg. pans and simultaneously transferring the crystals from pan to pan of the series in a direction opposit to that in which the soln. flows.

U. S., 1,004,934, Oct. 3. E. TAYLOR, Brooklyn, N. Y. **Plastic composition,** consisting of clay, vulcanized oil and a nitrated oxidizable oil, *e. g.*, linseed or castor oil.

U. S., 1,007,846, Nov. 7. O. BUSSE, San Francisco, Cal. **Preparing a design in multiple on lithographic stones** by sensitizing the surface of the stones by coating with a prep. of Fe and NH_4 citrate, $AgNO_3$ and citric acid in H_2O, drying, exposing to sunlight under a negative of the design, washing and fixing in a soln. of Na_2SO_3, alum, HOAc and $Na_2S_2O_3$ in H_2O and drying to prepare the surface for the draftsman's ink and crayons.

U. S., 1,008,070, Nov. 7. C. ROLLIN, Newcastle-upon-Tyne, England. **Producing barium oxide from barium hydroxide** by heating the anhyd. $Ba(OH)_2$ to a high temp. upon a bed containing BaO_2 supported upon a firm bed of BaO.

U. S., 1,008,319, Nov. 14. H. FRASCH, New York, N. Y. **In mining sulfur by fusion, sinking a well into the deposit,** forming a retaining wall in the deposit by the introduction of sand, introducing hot H_2O into the deposit to melt the S in the space enclosed by the wall, allowing the H_2O to flow away underground and removing the melted S.

U. S., 1,008,321, Nov. 14. J. GILL, Pendleton, England. **Making ferric oxide** by treating waste or other liquor containing $FeCl_2$ with $CaCO_3$ and blowing CO_2 and

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air through the soln. to ppt. $FeCO_3$ and oxidize it into $Fe_2(OH)_6$ and then calcining the latter.

U. S., 1,008,336, Nov. 14. K. HÖFLER, Hanover, Ger. **Composition for polishing lithographic stones, etc.,** consisting of KH oxalate 30, grinding powder 30, coloring matter sol. in H_2O 20, and sawdust 20 parts.

U. S., 1,008,690, Nov. 14. E. BRAUER, Leipzig, Ger. **Concentrating nitric acid** by distilling with arsenic acid or H_3PO_4.

U. S., 1,008,845, Nov. 14. A. G. MEIER, St. Louis, Mo. **Dental filling foil,** made of Sn-Ag alloy plated with Au.

U. S., 1,008,847, Nov. 14. F. MEYER, Uerdingen-on-the-Rhine, Ger. Assignor to R. Wedekind & Co., G. m. b. H., same place. **Making sulfur dioxide** by heating a mixt. of gypsum, SiO_2 and pyrites, the latter being used in such amt. as to furnish, by exothermic reaction, the heat necessary for the decomp. of the gypsum with SiO_2 and bringing a gas containing O, *e. g.*, air, into contact with the mixt. after the latter has been ignited.

U. S., 1,008,970, Nov. 14. J. J. KESSLER, St. Louis, Mo. **Dental foil,** made by placing Sn foil between 2 Au foils and uniting them by pressure.

U. S., 1,008,972, Nov. 14. P. F. LENHART, Brooklyn, N. Y. **Cork composition** formed of finely divided cork 160, gum arabic 2, starch 1.5, gelatin 1, sugar 1, glue 2 and glycerol 1 part.

U. S., 1,009,196, Nov. 21. R. SOHLMAN, Bofors, Sweden, and W. A. WILSON, Ardeer, Scotland. **Concentrating and distilling nitric acid** from its mixts. with dil. H_2SO_4, by feeding the mixt. by gravity into the top of a closed chamber, subdividing it into fine streams during its descent by acid-proof contact surfaces, introducing a heated vaporizing gas into the bottom of the chamber and heating the opposed currents of acid mixt. and gas by heat conducted from a current of hot gases exterior to the chamber decreasing in temp. from the bottom to the top of the chamber, the path of flow of the acid mixt. being sufficiently long that mainly HNO_3 vapor is delivered from the top of the chamber and dil. H_2SO_4 from the bottom.

U. S., 1,009,197, Nov. 21. R. SOHLMAN, Bofors, Sweden, and C. O. LUNDHOLM, Ardeer, Scotland. **Concentrating weak nitric acid** by making a preliminary conc. by direct contact with a current of hot gases, mixing the HNO_3 thus conc. with conc. H_2SO_4 and distilling the HNO_3 from the mixt. and then concg. the H_2SO_4 for re-use in the process, the same current of hot gases being successively utilized for concg. the dil. H_2SO_4, distilling strong HNO_3 from the mixt. of HNO_3 and H_2SO_4 and for the preliminary conc. of the dil. HNO_3.

U. S., 1,009,558, Nov. 21. S. PEACOCK, Chicago, Ill. **Producing zinc sulfoamides** by heating Zn sulfide in N to above 800°.

U. S., 1,009,560, Nov. 21. *Idem.* **Rendering non-deliquescent, commercial salts** composed of non-deliquescent constituents mixed with impurities containing deliquescent salts, *e. g.*, $NaNO_3$ containing $CaNO_3$, $MgSO_4$ and $MgCl_2$, by heating to about 180° and while stirring subjecting to the action of NH_3 gas.

Brit., 4,404, Feb. 21, 1911. G. BERNHARDT, Neuenkirchen in Luneburg. A **composition for renovating the color of white footwear** and the like, consisting of talc 1, vaselin 2, gluten 12, Zn-white 15, chalk 40, thoroughly stirred up into a thin paste with spirit (such as benzine) 9, dild. with H_2O 46 to form it into a thin plastic mass which is thinly coated, by means of a brush or sponge, on white footwear and the like, after which the articles are rapidly dried and the comp. firmly rubbed with a non-fluffing piece of cloth.

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Brit., 8,318, Apr. 3, 1911. A. BARTELS, 102 Buxtehuderstrasse, Harburg a/d. Elbe, Ger. In the manuf. of **artificial horn from casein**, the hardening agent is added to the casein and the mixt. kneaded and pressed in the manner described in 21,750, of 1910.

Brit., 11,640, May 13, 1911. CONSORTIUM FÜR ELEKTROCHEM. IND., 54 Gugelstrasse, Nuremberg, Ger. **Generating hydrogen** from Si and alk. solns. by effecting the soln. of the alkali and the heating of the liquid to the temp. necessary for the reaction of the Si, without the application of external heat, by the heat produced by a chem. reaction, especially by substances generating H, such as Al or Al alloys, the said substance being advantageously placed beneath the alkali; cf. *C. A.*, 5, 1666.

Ger., 228,961, Sept. 30, 1909. LYCODINWERKE G. m. b. H., Berlin. **Molding powder** from carbonaceous material, satd. with rosins. The base is powdered coke, to which coal dust and keiselguhr are added.

Ger., 229,458, April 2, 1909. WASCHINENFABRIK GREVENBROICH, Rheinl. In a **cleaning device for filters**, employing air and H_2O and a rotating feeding means underneath the material to be filtered.

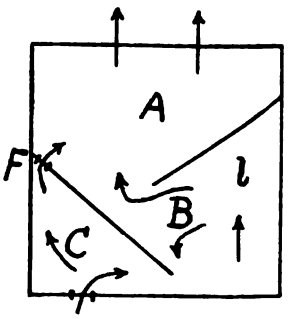
Ger., 229,468, Jan. 14, 1910. SCHWEIP, FLÜSSIGGAS-FABRIK L. WOLF AKT. GES., Zürich. Lighting gas previously used as cooling means is added for **preliminary cooling of gas to be liquefied**, utilization of the chill of the cooling means being obtained thereby. The process recommends itself for starting plants producing liquefied gas in which the cooler has not yet attained the necessary low temp.

Ger., 229,699, March 2, 1910. J. POHLIG, Cöln a/Rh. **Lifting fusing liquid material by means of a siphon.**

Ger., 229,727, Oct. 19, 1909. C. SCMÖLKE, Berlin. **Cigar and cigarette holders** formed wholly or partly of organic porous filtering material, natural or artificial, impregnated with nicotine binding substances. The filters are heated, before the impregnation, in a vacuum to remove malodorous vapors, resulting from the heat developed during use.

Ger., 229,765, June 12, 1909. G. BEIL, Berlin-Wilmersdorf. App. for **grinding and mixing granular and gritty substances** with simultaneous sepn. of coarse foreign bodies in a drum-mixer perforated on one end.

Ger., 229,871, Jan. 30, 1910. A. WIESE, Hannover-Haniholz. App. for **crystallizing hot salt solutions.** The cooling cells are suspended lengthwise and parallel, and rounded off on their bottoms to give a narrow cross-section so that the remaining space is increased, the salt consequently not adhering in a thick layer to the cells so that it seps. by its own gravity. As, through the widened space below, more soln. flows than through the upper half of the trough, the rear faces of the cells are widened in such manner as to cause the soln. to flow evenly through the app.



Ger., 229,999, Jan. 28, 1909. R. PAVLITZCK, Ladenburg, Neckar. **Filling for reaction chambers** composed of cube-like units.

Ger., 230,182, Jan. 27, 1910. C. SLEINE, Düsseldorf. Device for **separating impurities from gases.** The gases flow through vessel A in the direction of the arrows. To the wall, the inclined planes B are secured, forming angle 1. A small opening, F, 3 to 4 mm. wide, is provided, through which a small part of the gas is forced, so that the in-coming gas can wash

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the corners, strike the inclined surfaces, and form whirlpools. The width of the fissure F depends upon the quantity of the gas and the rate of speed of the gas.

Ger., 230,220, June 9, 1909. O. LEUNER, Ladenburg. **Desiccation of liquids.** The liquid to be desiccated is spread over the heating surface through several moving nozzles feeding the liquid, and after drying is removed by scrapers. The arrangement is such that the liquid is spread as a continuous wave-like band transversely to the direction of movement of the advancing heating surface.

Ger., 290,291, March 28, 1909. H. FÜRMEYER, Cassel. **Air-filtering app.** with adjustable walls for the sepn. chamber. The cross-section of the filtering chamber is narrowed or widened so that its form and the sequence of cross-section remains preserved.

19. GLASS AND CERAMICS.

C. E. BARTON, A. V. BLEININGER.

A New Dry Press. ANON. *Tonind. Ztg.*, 35, 1327.—Provides for filling the forms with a uniform wt. of raw material. W. L. BADGER.

Causes of the Expansion of Dinas Brick. P. J. HOLMQUIST. *Tonind. Ztg.*, 35, 1323–7.—The author agrees with Grum-Grzmailo (*C. A.*, 5, 3139) that the cause of the expansion is the transformation of quartz into the less dense tridymite, but differs in his explanation of the intermediate steps. Instead of the quartz dissolving in the ground material and recrystallizing as tridymite, the two processes going on simultaneously, H. claims that the quartz must be converted to a glassy amorphous or fused condition, and that tridymite crystals only appear in such glassy grains. If heated too suddenly, or especially if the quartz is in "undulated" or deformed grains which have been subject to strain in their formation in the rock, the quartz falls to a fine powder whose sp. gr. is even less than that of tridymite. Hence, quartz (ordinary milky quartz often shows this undulated structure) or quartzites which contain deformed grains are not suitable for dinas brick. Most quartz used for dinas brick contains about 2–3% impurities, mainly $(Al, Fe)_2O_3$ and it is usual to add about 2% CaO. It is concluded that the binder is mainly $CaSiO_3$, which forms a eutectic with SiO_2, according to Day & Shepard, with a m. p. of 1417°. This is the lowest m. compd. present. G.'s suggestion is to fire the brick slowly till the transformation is complete. H. does not believe this is possible in practice, and cites that the most satisfactory dinas brick have about $^1/_2$ to $^1/_3$ of the quartz transformed. The remainder of the transformation, allowing for compression and settling as the binder softens, results in only about 7% expansion. Brick that show mainly unchanged quartz grains are poorly made and should not be used; brick with all the quartz transformed to tridymite are seldom or never met with. W. L. BADGER.

Lead Silicates (WEILLER). 6. Specific Heats of Silicates (SCHULZ). 8.

FRANCHET, L.: **La fabrication industrielle des emaux et couleurs céramiques.** 8°, 188 pp., 6 Fr.

LESUR, A.: **Dictionnaire pratique des marques de porcelaine.** Paris: 8°, 10 Fr.

U. S., 1,004,080, Sept. 26. S. O. RICHARDSON, JR., Toledo, Ohio. **In making glass, fusing the batch, feeding the fused batch into a closed m. chamber, reducing it therein and causing a continuous flow of material from the chamber to the point where it is gathered for working.**

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U. S., 1,008,300, Nov. 14. J. H. BACH, Chicago, Ill. **Burning bricks made from porous clay by placing them in a kiln with uniform spaces throughout the mass, dividing the kiln into sep. sections, firing the first section by natural draft until a max. heat is obtained at its beginning, applying artificial draft at the forward end of the section and holding the water-smoke back to a certain distance in advance of the max. heat and advancing the water-smoke and heat successively from section to section.**

U. S., 1,008,464, and 1,008,465, Nov. 14. M. J. HEALY, Bradford, Pa. **Apparatus for drawing glass.**

U. S., 1,008,902, Nov. 14. WM. HAEHNEL, New York, N. Y. **Reflector of earthenware having a glazed face bearing a Ag deposit so thin that by itself it would be transparent and a transparent polished protecting Pt deposit.**

Ger., 229,437, June 29, 1909. A. L. MILENTZ and J. FR. WEINERT, St. Louis, U. S. A. **Glass-cutting machine with two cutting tools and arrangements for guiding the glass pane which permit the cutting of the pane without rotation in 2 different directions.**

Ger., 230,006, January 18, 1910. GLASFABRIKEN UND RAFFINERIEN, J. INWALD AKT. GES., Wien. **Blowing glass with colored coating. The lump of hot glass drawn from the pot is covered with colored glass and this colored layer of glass is cut through or reduced in thickness by pressing or blowing into a form provided with sharp edges. If from such glass a product is made the coloring effect of the coating appears weakened or is absent at those places where it was cut through, whereby the finished form is figured.**

20. CEMENT AND OTHER BUILDING MATERIALS.

C. N. WILEY.

Proposed Standard Specifications for Portland Cement. Conference U. S. Gov. Dept. Heads, Nov. 1, 1911.—Subsequent to calcination no addition for regulating the set in excess of 3% is permitted and it is recommended that the ignition loss shall not exceed 4%. The limits for SO_3 and MgO are 1.75 and 4%, resp. The sp. gr. has been raised to "3.10 on the work". Fineness is not more than 8% residue on 100 and 25% on 200 sieve. A 50 g. sample is used and operation continued till not more than 0.05 g. passes in 1 min. Cements not passing this, are to be tested by hand. Initial set not less than 45 min. and final set not over 10 hrs. Consistency is detd. by the Vicat needle or by the "ball" method. For sand briquets, 10% of water by wt. of dry material is used. The setting time is detd. by Gilmore needle. Tensil tests required are 500 at 7 and 600 at 28 days for neat and 180 at 7 and 275 lbs. at 28 days for 1–3 sand briquets. For chem. analysis the method of *J. Soc. Chem. Ind.*, 21, 12, is recommended and in addition the detn. of insol. residue which must not exceed 1% is carried out as follows: A 1 g. sample is digested on the steam bath in HCl (approx. 1.035 sp. gr.) till dissolved. The residue is filtered, washed with hot H_2O and filter and contents digested on steam bath in a 5% soln. of Na_2CO_3. Filter, wash with hot H_2O and then with HCl, followed by hot H_2O. Ignite and weigh; cf. *C. A.*, 3, 366; 4, 1534, 2991; 5, 181. A. J. PHILLIPS.

Oil-mixed Concrete. S. D. NEWTON, *et al.* *Proc. Am. Soc. Civil Eng.*, 37, 1231–41. A. J. PHILLIPS.

Iron Ore Cements. A. E. WILLIAMS. *Thesis*, Univ. Ill., 1910.—An investigation of Fe ore cements for use in sea H_2O. Using Newberry's formula $x(3CaO.SiO_2) + y(2CaO.Al_2O_3)$, varying quant. of flint, whiting, Fe_2O_3 and Al_2O_3 were mixed in which

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the mol. ratio of SiO_2 to R_2O_3 was 0.11–9.0. No mixes were made between 4 and 9. They were molded into marbles and burned in a magnesite kiln with kerosene and compressed air; considerable fusion taking place in each case. All the cements failed in the b. test and a new series was made, using Bleininger's formula, $(2.8CaO.SiO_2) + (2CaO.Al_2O_3)$. The mol. ratio of SiO_2 to Al_2O_3 for good cements being about 5.1–6.8, the ratios of the mixes were varied from just above to just below the limits. The burn. temp. was 1300–1400° and all stood the b. test, though those containing no Al_2O_3 showed expansion. The initial setting time was 4.5–26 hrs. and in no case was final set under 36 hrs. It was necessary to harden in a moist atmosphere as the cements were liable to dry out before complete hydration had occurred. For the sea H_2O tests, 1 in. cubes were aged 28 days and placed in artificial sea water in a steam cylinder and kept under 125 lbs. pressure at 150° for 3 days. The Portland cements were unaffected while the Fe ore samples were destroyed by expansion of free lime. The samples destroyed were those contg. no Al_2O_3. When kept for 8 days under pressure the Portland cements were more affected than the Fe ore cements contg. Al_2O_3. The conclusions are that less silicate of lime should be present when Fe_2O_3 is used alone and that the ratio of SiO_2 to R_2O_3 varies, depending on the relative prop. of Fe_2O_3 and Al_2O_3 present. Also that the CaO may be reduced below 2.8 CaO in Bleininger's formula with satisfactory results. A formula, $4(2.8CaO.SiO_2) + (2CaO.8Fe_2O_3) + (2CaO.2Al_2O_3)$, is suggested for further experimenting in which the SiO_2 and CaO should be varied. A. J. P.

The Destruction of Hydraulic Cements by Alkali Salts. E. Burke and R. M. Pinckney. Montana Agr. Exp. Sta., *Bull.* 81.—Some additional work and fuller conclusions than in *C. A.*, 5, 2420. The antiquated idea is held that the strength of cement is due to the interlocking of cryst. $Ca(OH)_2$. By the action of NaCl (one of the new salts used), CaO replaces Na_2O which carbonates in the air and dissolves SiO_2 and Al_2O_3. On treatment of cements with NaCl, contrary to the experiences of Candlot, Deval, *et al.*, no Cl was found accumulated in the residues, as an indication of absorption. The Ca sulfo-aluminate theory of disintegration is rejected chiefly because the air-dried residues did not show enough combined H_2O to account for the presence of the salt. But as shown by Klinkerburg (*Dingler's Poly. J.*, 249, 89–95) and Deval (*Tonind. Ztg.*, 26, 1081), this salt rapidly loses its water at ordinary temps. in air. Further unexplained discrepancies occur in the balancing of the MgO and SO_3 retained by the cements, as shown by analysis. The statement is also made that Mg as well as SO_4 ions exert a disruptive action, whereas MgO is always deposited on the surface or in some previously formed crack and is practically inert. Tensil tests on briquets water-proofed with 1% soap soln. showed a deleterious effect on Portland cement and the opposit on natural cement. Weak solns. of Al sulfate were beneficial to both kinds of cement; however, the fineness of the cement is important as indicating the % of voids to be filled and as this is not given the results cannot be considered conclusive. A. J. P.

Waterproofing Concrete. W. L. Gadd. *Cement Eng. News*, 23, 161–3.—A review of methods of water-proofing giving the analysis of "Pharos" compd. Free fat 20.22%, CaO soap 16.12, CaO 30.45, MgO 21.15, H_2O 9.09, SiO_2 1.17, R_2O_3 1.18, rest 0.62. The addition of a finely divided insol. substance to fill the voids is considered the most promising method. A. J. P.

Waterproofing of Concrete. P. Mecke. *Cement Eng. News*, 23, 320–1.—The gaging of cement with more H_2O than can chem. combine causes the formation of pores by the evapn. of surplus H_2O. $Ca(OH)_2$ and powdered minerals cannot fill these pores; hence, they are useless. Surface comps. can be applied only to dry walls and do not withstand pressure. Integral comps. act chemically and mechanically

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by reacting and being deposited in the pores. Variations in the pressure of water will indicate whether a quickly or slowly forming insol. product to fill the pores may be used. A. J. P.

The Effects of Chemical Action on Reinforced Concrete. H. C. HUTCHINS. *Cement Eng. News*, 23, 163–5.—Review. A. J. P.

Effect of Hydrated Lime on Cement Mortar. H. GARDNER. *Eng. Record*, 64, 309–16.—From the results of tests made to check the claims of $Ca(OH)_2$ mfgrs., it is concluded that where no effort is made to grade the mix so as to secure an impervious concrete the addition of small amts. of $Ca(OH)_2$, loam, clay, alum or reground cement may be beneficial, but the displacing of more than 15% of cement by $Ca(OH)_2$ is worse than using no cement at all; cf. *C. A.*, 4, 94, 1230. A. J. P.

The Effect of Electric Currents on Reinforced Concrete. H. BARKER AND W. UPSON. *Proc. Am. Inst. Elec. Eng.*, 30 [11]; *Eng. Record*, 64, 622; see *C. A.*, 5, 1984, 2318, 2421. A. J. P.

Impermeability Tests of Concrete. W. A. BURTON. *Cement Eng. News*, 23, 155–6.—Tests made to secure an impermeable concrete 4 in. thick and subjected to a head of H_2O of 100 ft., showed that satisfactory results were secured with reground cement, which increased the tensil strength. Soap and alum were satisfactory but did not increase tensil strength. Reground clay was unsatisfactory. A. J. P.

I. The Removal of Rust from Iron in Concrete. II. Two Chemical Reactions in a Railroad Tunnel. P. ROHLAND. *Z. angew. Chem.*, 24, 2011–2.—A reiteration of *C. A.*, 5, 583 and an account of the destruction of the walls of a tunnel by seepage containing CO_2 and H_2SO_4 and of the CaO mortar in the roof by formation of $CaH_2(SO_4)_2$ from the S gases of the locomotive. A. J. P.

Corrosion of Iron in Concrete Structures. ANON. *Science Conspectus*, 1, 128.—Tests at Mass. Inst. Tech. show that the greater the stress undergone by the material, the slower the corrosion of the Fe. A. J. P.

Effect of the Ash of the Coal in Burning Cement in Rotary Kilns. PHILIP WECHSBERG. *Tonind. Ztg.*, 35, 1145–6.—An analysis was made of the raw mixture, the clinker, and the ash of the coal from composit samples taken over the whole length of the run (10–11 hrs.). The results were, in %: I. Raw mixture, SiO_2, 14.8; R_2O_3, 4.5. CaO, 44.3. Ratio of SiO_2 to R_2O_3, 3.29. Clinker; SiO_2, 24.2; R_2O_3, 7.9; CaO, 67.5. Ratio, 3.06. Ash of coal (25.0%); SiO_2, 40.0; R_2O_3, 33.8; CaO, 17.0. II. Raw mixture, SiO_2, 15.0; R_2O_3, 4.7; CaO, 44.0. Ratio, 3.19. Clinker; SiO_2, 23.8; R_2O_3, 7.9; CaO, 67.5. Ratio, 3.01. Coal ash (12.2%); SiO_2, 35.9; R_2O_3, 47.8; CaO, 4.5. The tendency of the ash of the coal is to lower the $SiO_2 : R_2O_3$ ratio and thus lower the temp. of sintering. Hence, poor coals, high in ash, may be more efficient (compared with coals of lower ash) than would be calc. from the heat value.

W. L. BADGER.

Influence of the Addition of Alum and Soap on the Setting Time, Strength and Permeability of Cement. H. BURCHARTZ. *Beton u. Eisen*, 16, 348–52.—Using the Sylvester process, tests were made on 6 Portland and 1 Fe ore cements. The alum was added in powder form and the slightest additions accelerated the set. Using 10 and 20% soft soap solns. alone the set was also accelerated, increasing directly as the % of soap present. There was considerable variation in the strength tests, in some cases the addition of soap and alum giving higher strengths than the original cements. This was found to be the case with coarse samples. With fine cements the strength fell off in some cases 50% and compression was more affected than tension. The additions of both soap and soap with alum were beneficial in reducing permeability, especially in lean mixes; cf. *C. A.*, 4, 956; 5, 2926. A. J. PHILLIPS.

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The Water Necessary for Mixing Plaster of Paris Mortars. A. MOYE. *Tonind. Ztg.*, 35, 1250.—$CaSO_4.1/2H_2O$ contains, theoretically, 6.16% H_2O. From an actual water detn. it can be calc. whether the plaster is over- or under-burned. About 7% is common, which corresponds to 5.06% unburned gypsum. In making mortars, about 68 l. H_2O are used per 100 kg. plaster of Paris. To convert 100 kg. to the dihydrate, 17.7 l. are sufficient; hence, 50 l. must be evapd. to dry the plaster.

W. L. BADGER.

Removal of Dust from Flue Gases. ANON. *Tonind. Ztg.*, 35, 1213–6.—Describes centrifugal dust catchers, wet filters and spraying systems, for the removal of dust from the flue gases of rotary kilns and dryers in cement plants. W. L. B.

Dust Catchers for Rotary Kilns. ANON. *Tonind. Ztg.*, 35, 1109–12.—Among dry methods are mentioned settling chambers with baffle walls; and the use of the old ring furnaces in plants that have been remodeled. Wet methods, for instance, Koerting spray nozzles, are more to be recommended. W. L. B.

Influence of Temperature and Length of Heating in Burning Gypsum. CHENU. *Tonind. Ztg.*, 35, 1177–81.—Gypsum was heated in an elec. furnace at varying temps. and for varying lengths of time. Conclusions: Heating 4 hrs. at 150° gives the half-hydrate. At 200° the transformation into sol. anhydrite is complete in 5 min. Burning at 250° for 1/2 hr. is the best, both as to time of setting and strength. At temps. from 250–600° the strength decreases and is practically zero from 550 to 1000°. From 1100–1300° the strength begins to increase again. The amt. of water necessary for tempering decreases with the temp. of burning; and the plaster after setting is denser, the higher the temp. Gypsum burned at low temps. shows a yellow color and leafy structure under the microscope. From 700° on, the grains are transparent, strongly refracting, and tend to be spherical. When allowed to set on the slide, gypsum burned at low temps. appears as aggregates of long needles, in rosets. From 400° on, the crystals are less frequent; and they do not appear in plasters burned above 500°. From 700° on, the plaster is composed of spherical grains, unchanged on setting.

W. L. B.

The Dry Slacking of Lime. ANON. *Tonind. Ztg.*, 35, 1248–9.—The advantages of dry slacking are given. An installation is described, which is dust-free, almost automatic and requires only about 1 sq. m. floor space per ton of daily capacity.

W. L. B.

Gypsum is Gypsum. KARL KOSER. *Tonind. Ztg.*, 35, 1147.—K. advocates gypsum mortars because of their quick setting and the small amt. of water which they introduce into the masonry. An editorial note criticizes the suggestion on the ground that 10,000 kg. of burned lime, with sand, makes 80 cu. m. of mortar; while the same amt. of gypsum only makes 10 cu. m.; thus making it necessary for gypsum to be very cheap to compete with lime. Exception is also taken to the statement regarding water; it is claimed that com. gypsum (carrying about 7% H_2O) needs 60–80% additional to make a mortar. W. L. B.

Properties of Swedish Sand-lime Bricks. GUSTAV KNUDSON. *Tonind. Ztg.*, 35, 1323.—The av. results from 100 tests on a contract of 3.3 mil. bricks were: Crushing strength of cubes, dry, 120–160 kg. per sq. cm. Some reached 190 kg. Water absorption, max., 13.8%. When dried at 100° and satd. with H_2O, freezing at —15° and thawing in luke-warm water 25 times did not injure them in the least. When a loss in wt. was observed at all, it was less than 1% and only one sample reached 1.9% loss. This sample on drying after the freezing tests showed a strength of 126 kg. per sq. cm. W. L. B.

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Effects of Smoke from Locomotives in Tunnels. ANON. *Tonind. Ztg.*, **35**, 1308.—Assuming the coal to contain 3% S, and that $^2/_3$ of this escapes in the smoke as H_2SO_4 and making various assumptions as to traffic, it is calc. that 0.6 kg. of gypsum would be formed per year for every sq. m. of tunnel surface. W. L. B.

Uses of Commercial Woods of the United States. II. Pines. W. L. HALL AND H. MAXWELL. U. S. Dept. Agr., Forest Service, *Bull.* 99.—Treatise on 37 species of pine growing in the U. S., the total output of lumber of which in 1908 was 48% pine. C. N. WILEY.

Built-up Roofs. W. S. BABCOCK. *Eng. Soc. W. Penn.*, **27**, 345–73.—Tars are seldom used for fluxing asphalts as they do not mix readily. Poor fluxing increases brittleness, loss of elasticity and binding power. The free C in coal tar, which is superior to asphalt for water-proofing, causes it to be less affected by temp. changes. The weathering of tar causes the formation of a surface coat which protects the interior. High C tars weather better than low C tars (*C. A.*, **4**, 1231). Water-gas tar contains some paraffin and is more affected by water. Oil tar products are readily weathered. Coal tars are condemned for their lack of uniformity and brittleness in cold weather. The use of asbestos fibers impregnated with asphalt and of reinforced cement tile is discussed. A. J. PHILLIPS.

Naphthalene in Road Tars. P. HUBBARD AND C. DRAPER. Office of Pub. Roads, *Circ.* 96.—The fluxing value of naphthalene for tar pitches is greater than though similar to, the heavier naphtha-free tar distillates, until the mix becomes satd. with naphthalene. Its addition in small % to hard pitches produces marked increase in fluidity; in soft pitches the increase is slight. Where naphthalene is added beyond the satn. point a rapid decrease in fluidity of tars is observed at temps. below m. p. of naphthalene; above this m. p. the fluidity continues to increase. A. J. P.

The Effects of the Tarring of Roads on the Nearby Vegetation. C. L. GATIN. *Compt. rend.*, **153**, 688–90.—Different varieties of trees in the Longchamps Nurseries were sprinkled with dust gathered from tarred roads. All the plants were affected, some of the leaves being burned, others browned or perforated and many of the young branches stunted. Biometric measurements showed smaller values in length and size in the case of the branches treated with tar dust. Similar expts. showed certain flowering plants to be less affected by the dust in proportion to their protection from the sun. A. D. DUNBAR.

Reinforced Concrete Pipes (ROHLAND). 14. Red Earth of Catania (MANZELLA). 8.

MALETTE, J.: **Analyse chimique des chaux et ciments.** Paris: 8°, 73 pp.

U. S., 1,004,168, Sept. 26. CHAS. HOWARD, New York, N. Y. **Vulcanizing wood** by subjecting the unheated wood to a vacuum, then to the combined action of a vacuum and a progressively increased temp. raised gradually to a maximum below 121°, then treating the heated wood with moist heat at a temp. below 121° and then subjecting the moist wood to a temp. of about 193°.

U. S., 1,004,380, Sept. 26. C. DAHER, Marseille, France. Assignor to Soc. J. et A. Pavin De Lafarge, Viviers, France. **Making cement** by mixing with blast furnace slag while still fluid, lime and aluminous material, to produce a mixt. corresponding approx. $SiO_2.2CaO + Al_2O_3CaO$, and then granulating and drying the mixt. so formed, the materials combined with the slag being mixed with it in a fused state.

U. S., 1,004,844, Oct. 3. W. W. BENNETT and C. S. PILKINGTON, Westerville,

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Ohio. **Composition for coating cement molds**, consisting of gasolene 80%, resin 14% and $C_{10}H_8$ 6%.

U. S., 1,007,832, Nov. 7. G. E. WHITNEY, Yonkers, N. Y. **Making paving blocks** by mixing hot stone particles, fines and bituminous cement and subjecting segregated masses of the mixt. to successive compressions with an interval of inactivity of the mixt. between compressions.

U. S., 1,007,833, Nov. 7. W. S. WILKINSON, Wytheville, Va. **Making asphalt paving blocks** by mixing hot stony material, after treatment with petroleum residuum, with a heat-softened asphaltic cement, segregating masses to form blocks, compacting under heavy pressure while hot and cooling in H_2O.

U. S., 1,007,877, Nov. 7. K. KOENMAN, Bernardsville, N. J. **Preserving wood** by impregnating it in a closed vessel with NH_4 polysulfide, then drawing O through the wood and finally drying at a high temp. Small amts. of sulfide of As or Sn may also be used.

U. S., 1,008,433, Nov. 14. M. A. POPKESS, Kansas City, Mo. **Making a homogeneous, waterproof and malleable road-surfacing material** by disintegrating soil, loam or clay to reduce it to dust, and impregnating it with a bituminous binder so that the product, after compacting, contains no free binder and will not crack or disintegrate under traffic.

U. S., 1,008,864, Nov. 14. MAX RÜPING, Charlottenburg, Ger. **Impregnating wood or other porous material** by subjecting to the action of an impregnating liquid, *e. g.*, creosote or oil of tar, under a pressure of not more than 3 atm., then subjecting to a vacuum, then subjecting the material to gas pressure of several atm., then re-establishing the vacuum and repeating the gas pressure and vacuum treatments.

U. S., 1,008,974, Nov. 14. P. T. LINDHARD, New York, N. Y. **Rotary kiln for burning cement.**

Brit., 11,509, May 12, 1911. R. E. BRAND. **Artificial stone**; see *C. A.*, **5**, 2320.

Ger., 228,783, Sept. 23, 1909. J. TEUFEL, Stuttgart. In the manuf. of **plasters**, employing as the mounting an elastic cloth formed of alternate ribbed and smooth webs.

Ger., 229,329, April 3, 1910. PORTLAND-CEMENTFABRIK HANNA, G. m. b. H., Haiger in Dillkreis. In the manuf. of a **filtering body**, sintering to a hard product a compd. of kieselguhr, silica, etc., and a flux, applying a soft filtering layer of the same comp. and burning the whole below the sintering pt. The product can be obtained in one firing by so proportioning the flux in the 2 layers that only 1 layer sinters at the temp. of the furnace.

Ger., 229,626, Feb. 15, 1910. Addition to 221,329. A. MÜLLER, Wetzlar a/L. Concrete stones. **Slag cement** produced according to 221,329, by mixing with gritty lime, slaked with regard to the content of H_2O in the slag sand so that after the mixing the lime is completely slaked. In the present invention the mixt. of slag sand and slaked lime is not fully dried but is pressed in a plastic moist state in a mold into stones. The quantity of water to be added to the lime must be so measured that after the mixing an excess of water is still present and the compd. remains plastic.

Ger., 229,697, March 17, 1910. E. E. HIPPE, Frederiksberg n. Copenhagen. **Production of objects from mortar.** Upon a glass-plate, sludge mortar is spread and upon this a layer of dry or an almost dry powdered mortar, then the mortar is rolled upon a layer of paper cloth until the paper or cloth becomes moist as in making pastry by hand.

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Ger., 229,767, Oct. 30, 1907. G. KOHN, Hannover. **Fireproofing iron columns.** Fireproof hydraulic binders such as cement, and fibers such as asbestos, are formed on a pasteboard roller and wound around the body to be covered before hardening.

21. FUELS, GAS AND COKE.

J. D. PENNOCK.

The High Grade Coal Resources of Alaska. W. GRIFFITH. *Mining Sci.*, 64, 500–1. E. J. C.

Suction Producer for Peat and Low Grade Fuels. ANON. *Tonind. Ztg.*, 35, 1280–1.—The producer is made by the A. G. Görlitzer Maschinenfabr. u. Eisengiesserei and a thermal efficiency of 92% is claimed. The fuel is fed at the top. The air is partly drawn through a pipe which passes first through the well into which the warm water from the scrubber flows, and then up through the center of the fuel bed, discharging near the top. The remainder of the air is drawn up through the annular space surrounding the producer (the outer wall is double) and enters just above the fuel bed. The gas is drawn off from the center near the bottom. Thus all the air has to pass through preheating devices to the top of the producer, and then down through the whole depth of the fuel bed. W. L. BADGER.

A Plea for an Inventory of the Coal Supplies of the World. J. W. RICHARDS. *Met. Chem. Eng.*, 9, 463.—An address. C. A. COLE.

Proximate Analysis of Fuel, with Special Reference to Errors Resulting from the Method Adopted. A. M. SEN. *Coll. Guardian*, 101, 684.—Results of detns. of volatil matter, showing that heating by a muffle furnace gives greater uniformity than by a Bunsen burner. HORACE C. PORTER.

The Practical Value of the Determination of B. t. u. in Testing Anthracite. S. F. PECKHAM. *Chem. Eng.*, 14, 351–5.—P. describes the sampling and analysis of anthracite coal used by N. Y. City and includes a table of analyses of 100 samples. Since the cal. value varies with the fixed C and ash it would seem superfluous to make calorific detns. The value of the coal for firing varies also with its physical characteristics. E. C. SCOTT.

Peat Utilization in Germany. ANON. *Iron and Coal Trade Rev.*, 83, 772.—Germany has 5 mil. acres of marsh land. Best German peat, air-dried, contains 45% C, 1.5% H, 28.5% chem. combined H_2O, 25% moisture, 0.5–50% ash. Frank and Caro's process of gasification uses peat of 60% moisture, produces a good quality of heating and power gas and recovers 85% of the N as $(NH_4)_2S$. HORACE C. PORTER.

Gasifying Coal—A New Method of Coal Testing. H. STRACHE. *Chem. Ztg.*, 35, 1100.—Dry distillation of a small quantity of coal as ordinarily conducted in the lab. gives as a rule a small yield of gas and a larger yield of tar than is obtained on a large scale. This is due to the too rapid heating of the coal to a high temp. On a large scale the coal is only gradually heated up to the highest temp. of the ovens. To imitate the conditions in the coke ovens, the coal is gasified gradually in a small space. Using 0.1–0.2 g. of coal, the gas obtained is very small; the calorific value of the gas is detd. in an explosion calorimeter devized by the author. The principle of this calorimeter is that the cal. value of the gas is measured by the increase of pressure as indicated on a manometer connected with the explosion chamber. The distillation bomb is nothing more than a small tube of hard glass closed at one end and bent at right angles, the open end being connected with the explosion chamber of the calorimeter. A loose plug of asbestos is inserted in the tube to retain the tar. Having obtained the wt.

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of the tube, the coal and the asbestos plug, before and after the test, it is possible to det. the yield of gas, coke and tar. By passing a stream of O through the tube and burning the coke, the % ash is obtained. Furthermore, by passing the gaseous products of combustion through a $CaCl_2$ and soda-lime tube, the % of H and C in the coke is detd. Finally, by absorbing the CO_2 in the combustion products of the gas in the explosion chamber, the total quantity of C in the gas is obtained. The time consumed by a complete test does not exceed 1 hr. It is possible to calc. closely the cal. value of the coal. G. N. TERZIEV.

The Determination of the Delivery of Orifices and the Measurement of the Densities of Gases by means of the Standard Orifice. P. LAURIOL. *J. physique*, [5] 1, 466–9.—A note on the influence of d. on the measurement of gas flow through orifices. L. H. ADAMS.

A Rapid Method for the Photometry of Incandescent Gas Burners. P. LAURIOL. *J. physique*, [5] 1, 469–72.—A description of a convenient arrangement of gas burners when photometric detns. of a large number of them are to be made. L. H. A.

Unstable Hydrocarbons in Illuminating Gas. E. C. JONES. *Progressive Age*, 29, 865–8.—A series of expts. to det. the action of petroleum upon the c. p. of gas. C. A. COLE.

Filament Ignition of Gas. H. LYON. *Progressive Age*, 29, 833–6. C. A. C.

The Reactions between Hydrogen and Carbon Monoxide and the Effect of Steam on Carbon Monoxide at Elevated Temperature. ARMAND GAUTIER. *Compt. rend.*, 150, 1564.—The reduction of CO by H begins approx. at 400° resulting in the formation of H_2O, C and some CH_4. The mutual reactions are limited and equil. is reached at approx. 1000°. The formation of CH_4 is favored by a higher % of and by a greater velocity to prevent the splitting off of CH_4 at red heat. Between 450 and 650 traces of formol are formed but disappear again at 950°. C. A. C.

Simple Method for the Determination of Methane in Producer Gas and Enriched Water Gas. S. H. WORRELL. *Met. Chem. Eng.*, 9, 576.—100 cc. of gas are taken at atm. pressure; after absorption of CO_2, O, "Ills," CO and H, the residue is passed twice over heated CuO_2 contained in a glass tube constricted in 2 places, the constricted parts being filled with asbestos fiber. The tube between the constrictions is filled with the CuO_2 while glass wool is used at each end of the tube. The CO_2 produced is absorbed in a KOH pipet and loss in vol. is called CH_4 after correction for air in the combustion tube. C. A. C.

A Flame Test for the Estimation of Oxygen and Black-damp in Naked-light Mines. J. S. HALDANE. *Coll. Guardian*, 101, 1097.—Black damp in mines is N with 5–20% CO_2, the residuum from the air of the mine after various oxidation processes. Practically the deficiency in O is a measure of the % of black damp. A candle or lamp flame gradually becomes less and less stable as the O diminishes from the normal 17.5%, when the flame goes out. A lighted taper held vertically inside of a glass tube (3/4 in. diam.) is blown out by the upward draught at a height depending on the % O in the air. The tube is graduated in % O and % black damp and calibrated in known atm. Moisture vapor and CO_2 have a little greater effect in extinguishing flame than N has, and thereby complicate the calibration somewhat. HORACE C. PORTER.

The Function of Tar in the Condensation of Coal Gas. A. H. WHITE AND R. S. TOUR. *Progressive Age*, 29, 820–2.—Rapid cooling of the gas should improve its c. p. and heat value because of the lessened opportunity which tar has to remove benzene from the gas. The objection to the rapid cooling of the gas is the difficulty of mechanically removing the last traces of suspended tar which is finely divided be-

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cause of the quick cooling, and of removing the naphthalene which the tar has not had an opportunity to dissolve. C. A. COLE.

The Naphthalene Problem in Oil Gas Manufacture and Distribution. F. S. WADE. *Progressive Age*, 29, 873–5.—A series of expts. relative to the effect upon the vapor tension of naphthalene at diff. temps. in the presence of H_2O vapor, benzene, NH_3 and other vapors. C. A. COLE.

Improved Washer Boxes. ANON. *Progressive Age*, 29, 815.—The gas is passed through a series of 3 perforated plates, ranged one above the other, the edges of which are serrated. In passing through a plate the gas is divided into streams of bubbles which collect on the plate above forming a gas jacket from which the gas is again redistributed and the process repeated. This app. will overcome tar and naphthalene troubles and will perform half the work of the scrubbers in the recovery of NH_3. C. A. COLE.

Modern Gas-power Practice. S. E. FRASER. *Australian Inst. Mining Eng.*, 1911, No. 3, 20 pp. E. J. C.

Important Questions in the Utilization of the Power in Blast Furnace Gas at Smelters. HUBERT HOFF. Düdelingen. *Stahl u. Eisen*, 31, 993–1010, 1130–42.—An illustrated lecture. E. J. WITZEMANN.

The Recovery of Benzene from Coke Oven Gases. ANON. *Chem. Eng.*, 14, 448.—A review of the benzene recovery industry with sketches of app. and enumeration of some of the uses of the product. E. C. SCOTT.

Coke Oven Gas as an Open Hearth Fuel. A. P. SCOTT. *Chem. Eng.*, 14, 411–5.—S. reviews the results obtained at various steel works and concludes that the economical use of surplus by-product coke oven gas is for open hearth fuel. It increases the furnace tonnage without materially impairing the furnace life. E. C. SCOTT.

Developments at Carnock and Devon Collieries. ANON. *Iron Coal Trades Rev.*, 83, 432.—This plant has 24 Otto-Hilgenstock ovens with direct sulfate process. Tar is removed from the gas by a simple tar spray, the action of the spray being threefold: (1) It assists the suction of the gas from the ovens. (2) Adjusts the temp. of the gases to the dew-point of the H_2O vapors. (3) Removes the tars, even in their finest state of division. No condensation takes place in the saturator, and gases are slightly heated due to reaction between the NH_3 and H_2SO_4. C. A. COLE.

Coking—Pittsburg Coal Seam. J. W. BOILEAU. *Iron Trade Rev.*, 49, 1212.—The major portion of the Pittsburg coal seam can be coked and the so-called "Connellsville region" has no strict natural boundary. The new portion of the Pittsburg seam, which has been admitted to be of coking quality, runs into hundreds of thousands of acres, which would be sufficient to supply coke for the entire production of pig iron in the U. S., at the present rate, for several hundred yrs. C. A. COLE.

Effect of the Ash of Coal (WECHSBERG). 20. Thomas Gas Meter (PACKARD). 1. Effect of Smoke in Tunnels. 20. Radiation of Gas Mantles (FOIX). 2.

SCHMIDT, F.: **Die Leuchtgaserzeugung und die moderne Gasbeleuchtung.** Braunschweig: F. Wieweg & Sohn, 8°, 3 M.

U. S., Reissue 13,311, Nov. 7. L. L. SUMMERS, Chicago, Ill. Original Pat., No. 1,003,544 (*C. A.*, 5, 3904). **Coking furnace and conveyer therefor.**

U. S., 1,004,024, Sept. 26. J. A. HERRICK, New York, N. Y. **Gas-producing**

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apparatus, comprizing a pair of producers, a passage connecting them at their upper ends, a valve box near the lower ends of the producers, a tuyère box in each producer, conduits connecting the valve boxes with the tuyère boxes, a blast pipe leading into the valve box, a valve arranged to open to permit the blast to flow through one of the conduits and a second valve which prevents the blast from flowing through the other conduit.

U. S., 1,004,661, Oct. 3. H. KNAPP, Weimar, Ger. **Apparatus for purifying acetylene.**

U. S., 1,005,011, Oct. 3. L. C. FLACCUS, New York, N. Y. **Cleaning device for gas-collecting mains.**

U. S., 1,007,797, Nov. 7. E. RATHBUN, Toledo, Ohio. **Gas producer** having sep. upper and lower sections serving as fuel chamber and fuel support, resp., each section having a draft inlet and gas-discharge connection.

U. S., 1,008,274, Nov. 7. J. M. W. KITCHEN, East Orange, N. J. **Producer-gas apparatus.**

U. S., 1,008,448, Nov. 14. H. L. DOHERTY, New York, N. Y. **Making producer gas** by charging coal onto the fuel bed of a producer, heating it by the flame of previously formed gas from the producer, passing the gaseous mixt. from the combustion of the gas downward through the upper part of the fuel bed, and simultaneously passing a current of air mixed with H_2O vapor into the lower part of the fuel bed.

U. S., 1,008,449, Nov. 14. *Idem.* In **operating a gas producer,** submitting the fuel mass to the balancing action of draft pressure and suction simultaneously applied to opposit ends of the fuel mass, the pressure and suction being so mutually regulated as to produce a desired local pressure at any desired zone of the producer.

U. S., 1,008,450, Nov. 14. *Idem.* **Gasifying slack coal** by charging repeated small portions of it onto a bed of ignited coke in a gas producer, the coke being derived from previous portions of the slack, coking each of the portions by contact with the flame of previously made gas from the slack, breaking up the resulting coke, introducing a draft current of air and H_2O vapor into the upper part of the producer above the bed of fuel so that the combustion in the flame is sustained and the combustible vol. matter distilled from the slack is burned, passing the products of combustion and the excess of air and H_2O vapor downward through the fuel bed and withdrawing the gas so formed.

U. S., 1,008,480, Nov. 14. N. LATTA, Corliss, Wis. **Gas producer.**

U. S., 1,008,833, Nov. 14. A. M. LEVIN, Chicago, Ill. **Gas producer** having an up-draft decomposing section and an up-draft distilling section arranged to deliver the devolatilized fuel into the decomposing section, a fan for withdrawing gases from the upper part of the distilling section and for forcing them into the incandescent zone of the decomposing section, and a regulator controlled by the pressure at the outlets of the sections for varying the operation of the fan.

U. S., 1,009,064, Nov. 21. O. A. GOBBE, Jumet, Belgium. **Gas producer** having a hollow wall, a chimney communicating with the space in the wall at one side of the producer, a gas outlet at the opposit side of the producer and connections for leading a part of the gas from the outlet back beneath the body of coke in the producer and for burning a portion of the gas in the hollow wall.

Ger., 229,130, Feb. 10, 1910. A. ACHILLES, Böhlitz, Ehrenberg. Production of **acetylene.** The charge opening of the gas generator is outside the chamber where the generator is placed, collecting of gas in this chamber being prevented thereby.

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Ger., 229,484, March 15, 1910. DESSAUER VERTICAL-OFEN-GESELLSCHAFT. **Utilization of the condensates of gas for the immersion fluid in tar-collecting chambers.** Details of construction are specified.

Ger., 229,567, Oct. 3, 1909. BERLIN ANHALT. WASCHMENBAU AKT. GES., Berlin. **Gas cooler in the form of a tower in which the gas to be cooled flows from the bottom** to the top. The tower, provided with perforated floors in the interior, has in the upper part an outlet, and lower down 2 or more inlets at different heights to be closed by slides against the feeding conduit and the interior of the cooler. The tar collecting in the lower part is let out through an opening on one side of the bottom. When the gas to be cooled comes from the lower feed pipe through the connection, it flows through the entire height of the cooling space, but if the gas flows in, after closing the lower valve, through the higher connection, then it passes through but half of the utilizable cooling space.

Ger., 229,579, Feb. 13, 1908. K. H. SCHONEBERG, Berlin. **Fuel for internal combustion engins.** Picric acid is dissolved in C_6H_6 and the mixt. heated for some time in the current cooler, whereby the picric acid combines with the C_6H_6 into C_6H_6 picrate. In the following distillation, unchanged C_6H_6 and C_6H_6 picrate flows out. The distillate is then mixed with C_6H_6, benzine, naphtha, etc. The increased driving power of the product and its complete combustion is to be ascribed to the C_6H_6 picrate.

Ger., 229,606, May 20, 1908. G. O. WOLTERS, Weitmar i/H. **Distillation furnace for fuel high in moisture.** In the furnace a gas producer is arranged in such manner that the distilling chamber is placed between the producer walls and the outer furnace heating walls. In the latter, heating channels are arranged. The producer has a grate below and a pipe on top drawing off the generated gases, the latter serving, after obtaining the by-products, for the heating of the furnace walls, and with these gases are mixed the gases received in the gas producer before or after the by-products are obtained. After the heating of the furnace walls the gases of combustion can still be used for the preliminary drying of the fuel. In this construction of the furnace the heat radiating from the walls of the gas producer is utilized for the distillation.

Ger., 229,779, Jan. 6, 1908. Addition to 229,083. W. MÜLLER, Essen a/Ruhr. **Coke or gas chamber furnace;** cf. *C. A.*, **6**, 149.

Ger., 230,457, Oct. 26, 1909. FR. PAMPE, Halle a/S. Production of **gas from petroleum and alcohol or water** for heating, lighting and power. The alc. or H_2O is spread over an inclined heated surface and the petroleum is put on top of it as a layer so that in the evapn. a mutual penetration of the constituents takes place. This compd. is fed into a gasifier or superheater. In this retort the inlet for the superheated vapors and the outlet for the gases are arranged below in order that resulting powder-like or other sepns. can be removed readily.

Ger., 230,458, Jan. 24, 1909. FR. J. C. CARRUTHERS, Dumfries, Eng. **Air gas producer** with automatic regulation. The reservoir bell is provided with a circular expulsion chamber.

22. PETROLEUM, ASPHALT, COAL TAR AND WOOD PRODUCTS.

R. E. HUMPHREYS.

The Petroleum Resources of Illinois. RAYMOND S. BLATCHLEY. *Petroleum Rev.*, **25**, 101–2.—An historical review. R. E. HUMPHREYS.

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The Toyah Oil Fields of Reeves County, Texas. A. VINCENT WALLACE. *Petroleum Rev.*, **25**, 111–2.—An account of the geology of the field. R. E. H.

The Oil Fields of Peru. ANON. *Petroleum Rev.*, **25**, 77.—There are vast deposits, both of paraffin and asphalt base. The crude ranks among the richest in the world, containing a negligible quantity of tar, an odorless gasoline and kerosene, easily distilled and requiring no after treatment, the residue being second only to Russian oil, if to any, as a source of high-grade lubricants. Starting out in the sea, the wells run for many miles inland, and in depth from 260 to 2600 ft. R. E. HUMPHREYS.

The Oil Fields of Trinidad. E. H. C. CRAIG. *Petroleum Rev.*, **25**, 141–2.—Oil has been struck in 8 districts; and a few wells, flowing from 3000 to 4000 bbls. daily, have been brought in at depths of less than 1000 ft. Not all the crude is heavy and S-bearing. At Guayaguayare, the crude yields 19% of petroleum spirit, 60% illuminating oils, and only 4% of residue. At Barrackpare, it yields 23% petroleum spirit, 37% illuminating oils, and but 2.4% residue. These are of asphaltic base. Oils of paraffin base are known in Trinidad, and they are of low *d*, and high % of light oils and paraffin wax. R. E. HUMPHREYS.

The Dallas Field of Wyoming. *Petroleum Rev.*, **25**, 109. R. E. H.

The Use of Liquid Fuel in the World. ANON. *Retch.*; through *J. pétrole*, **11**, 194–5.—The use of petroleum as a fuel in place of coal is rapidly increasing for 3 reasons: (1) The considerable difference in vol., in favor of oils, (2) the greater coeff. of calorific power per vol., (3) the notable reduction in the no. of men required when using liquid fuel. F. M. ROGERS.

The Use of Heavy Oil from Coal Tar in Diesel Motors. ROEDERER. *J. pétrole*, **11**, 244–5.—The following specifications are given for a good oil. It must not contain more than 0.02% insol. in xylene, 0.05% ash, 3% fixed C, 1% H_2O; 6% ought to be volatil at 300°; its calorific value ought to exceed 8800 cal.; its flash ought to be above 65°; it must be fluid at 15° and not cryst. at 8° in a ½ hr. F. M. ROGERS.

What Oil will do in the Internal Combustion Engin of the Diesel Type. W. H. BOOTH. *Petroleum Rev.*, **25**, 97, 145–6.—A record of expts. carried out with this type of engin to det. amt. of fuel required at various loads. The efficiency of the Diesel engin over those using steam is demonstrated. R. E. HUMPHREYS.

The Production of Gasoline from Natural Gas. F. P. PETERSON. *Petroleum*, **6**, 2179–82; see *C. A.*, **5**, 2423. O. E. BRANSKY.

Presence of Cholesterol in Javanese Naphtha. A. K. KOSS, Karlsruhe and Warshaw. *J. Russ. Phys. Chem. Soc.*, **43**, 697–707.—No cholesterol could be detected in 2 samples of Javanese naphtha by means of digitonin (Windaus, *C. A.*, **3**, 900). Hence Marcussohn's statement that naphtha distillates owe their optical activity to cholesterol (*C. A.*, **2**, 3280; **3**, 1076) is incorrect. It is also shown that the presence of paraffin has no effect upon the rotation of the distillates, and that, whatever the active substance is, it is not decomposed at 280°. H. M. GORDIN.

Optical Examination of South Bolivia Naphthas. M. RAKUZIN. *J. Russ. Phys. Chem. Soc.*, **43**, 791–2.—Two samples from Yacuiba were examd. Sp. gr. of one at 15° was 0.7892 and carbonization const. (*K*) 75%; the other, sp. gr. 0.8916 and $K > 0.5\%$. Both samples and their distillates were optically inactive and did not react with Chugaev's cholesterol reagent (CCl_3CO_2H). H. M. GORDIN.

Optical Examination of Argentine Naphthas. M. RAKUZIN. *J. Russ. Phys. Chem. Soc.*, **43**, 792–3.—Four samples were examd. Their sp. gr. and carbonization

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consts. (K) were as follows: 0.8276, $K > 1\%$; 0.9306, $K > 1/_{32}\%$; 0.915, $K > 1/_{8}\%$; 0.9989, $K > 1/_{8}\%$. H. M. GORDIN.

Examination of Borislav Ozocerite. A. K. KOSS. *J. Russ. Phys. Chem. Soc.*, 43, 846–55.—Successive extraction with Et_2O, $CHCl_3$ and AcMe failed to yield definit compds., and in none of the exts. could cholesterol be found. The fraction b. 229–305° contained some optically active substances. The higher b. solid paraffins had a higher sp. gr. and a greater I number. H. M. GORDIN.

Naphthalene in Road Tars (HUBBARD, DRAPER). 20.

MITZAKIS, J.: **The Russian Oil Fields and Petroleum Industry.** London: 8°, 106 pp.

U. S., 1,004,219, Sept. 26. W. J. TRAVERS, Olinda, Cal. **Removing water from oil having an asphaltic base** and in which the H_2O is so contained that it does not settle out on heating, by heating the oil to about 100°, introducing the heated oil slowly into the bottom of a heated mass of oil at about the same temp., causing the oil to rize gradually and uniformly to the surface of the mass, so as to gradually reduce and remove the hydrostatic pressure in the oil, and allowing the H_2O to evap. and escape from the oil as it reaches the surface.

U. S., 1,004,632, Oct. 3. D. T. DAY, Washington, D. C. **Apparatus for treating hydrocarbon oils,** comprizing an oil still, a hydrogenator therein having 2 vapor chambers, an intermediate oil chamber connecting directly with one of the vapor chambers, tubes connecting the vapor chambers and containing porous contact material, a H supply pipe connecting with the oil chamber, and a vapor escape pipe, connecting with the second vapor chamber and having a value for controlling the pressure and temp. of H and distilled oil vapor in contact with the contact material.

U. S., 1,007,788, Nov. 7. E. N. MILLS, Oakland, Cal. **Transporting oil in a pipe** by mixing it with minute bubbles of air to ferm a foam and applying pressure to it.

U. S., 1,008,273, Nov 7. J. M. W. KITCHEN, East Orange, N. J. **Apparatus for distilling petroleum.**

U. S., 1,009,436, Nov. 21. W. PARTRIDGE and H. D. GUE, Brooklyn, N. Y. **Ornamenting wood** by introducing it into a chamber having a temp. as high as the ignition temp. of the wood and simultaneously supplying air to the chamber so that the wood is uniformly superficially carbonized.

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23. CELLULOSE AND PAPER.

A. D. LITTLE.

BELTZER, F. G. AND PERSOZ, J.: **Les matières cellulosiques.** Paris: C. Bèranger, 7.50 Fr.

PUJET, P.: **La fabrication du papier.** Paris: 382 pp., 5 Fr.

U. S., 1,004,375, Sept. 26. T. H. COSTELLO, Chicago, Ill. **Wearing face for blackboards,** consisting of a sheet of fibrous resilient material, *e. g.*, hard paper or

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vulcanized fiber, having coloring and abrasive material, *e. g.*, pumice 3% and lamp black 3%, incorporated therein to provide a wearing face.

U. S., 1,004,473, Sept. 26. B. F. A. SAYLOR, Rome, Ga. **Making paper pulp from resinous woods** by extracting the turpentine and rosin from the wood by subjecting it, mixed with a small % of dry NaOH, in a closed vessel, to the action of steam under a low pressure, and creating a vacuum in the vessel, then subjecting the vessel both on the inside and outside to a steam pressure of 80–100 lbs. for about 1 hr., then allowing the turpentine to escape from the top of the vessel and the rosin from the bottom, the steam pressure being still kept up, then closing the outlets from the vessel and submerging the wood in a soln. of NaOH of about 15° Bé., raising the steam pressure inside and outside the vessel to 120 lbs., again allowing the turpentine and rosin to escape, for 5 or 6 hrs., and finally withdrawing the pulpy mass drom the vessel.

U. S., 1,007,681, Nov. 7. C. ELLIS, Montclair, N. J. **Size for paper**, containing Jelutong resin and Na resinate.

U. S., 1,008,228, Nov. 7. P. WESTON, Dalton, Mass. **Making paper having a thinned portion** by removing from the web at the portion to be thinned some of the material by the application of suction.

U. S., 1,008,489, Nov. 14. H. PETERS, London, Eng. **Making material for films or threads** by heating cellulose with glycerol, treating it with a soln. of HCOOH, palmitic acid and alc. and subjecting the product to the action of an acetylizing bath consisting of Ac_2O, an alkali acetate, H_2SO_4 and glacial HOAc, and then neutralizing, washing and drying the product. The product is said to be sol. in about half the amt. of solvents required for ordinary cellulose acetate.

U. S., 1,008,557, Nov. 14. *Idem.* **Making material for films, etc.**, by heating cellulose with dichlorohydrin or epichlorohydrin containing palmitic acid at about 120°, removing these reagents, treating with HCOOH and MeOH, then treating with an acetylizing bath, neutralizing, washing and drying.

U. S., 1,008,779, Nov. 14. J. E. BONSER; Abilene, Tex. **Removing ink from paper** by washing and pulping the paper, macerating with turpentine, soap and H_2O, b., removing the scum, treating the pulp with PhOH and H_2O, draining, treating with Na_2CO_3 soln., neutralizing with dil. H_2SO_4 and subjecting the soln. containing the pulp to electrolysis.

U. S., 1,009,116, Nov. 21. W. H. WALKER, Newton, Mass. **Solvent for cellulose acetate, etc.**, consisting of acetylene tetrachloride and MeOH.

Ger., 230,292, Apr. 2, 1910. L. KAUS, Smichow, near Prag. **Paper pulp cleaner with a sifting** cylinder rotating in the pulp-box, the latter being divided by a vertical partition into 2 chambers of which the one carries the sifting cylinder and the other takes the pulp in excess and delivers it through a slide into the former chamber.

24. EXPLOSIVES.

C. E. MUNROE.

A Page in the History of American Torpedo Progress. G. W. BAIRD. U. S. N *J. Am. Soc. Naval Engineers*, 23, 838.—Important, illustrated, historical account of application and control of explosives by Col. S. Colt. CHARLES E. MUNROE.

Importation of Chemicals for Making Explosives into Turkey. *Board of Trade J.*, Oct. 5, 1911. (T. R.) *J. Soc. Chem. Ind.*, 30, 1232.—The Turkish government have

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decided to prohibit the importation of saltpeter, potash, $NaNO_3$, $NaClO_3$ and similar chemicals for use in the production of explosives. C. E. M.

Report Mines Branch. J. G. S. HUDSON. Dept. of Mines, Canada, 1910.—Detailed reports, with illustrations of inspection of explosives factories in Canada; explosion of "Virite" at Hull Que.; explosion of "Blaster's Friend" at Sand Point near Arnprior, Ont.; and on coal mine disaster at Bellevue mine near Frank, Alta. Also report on explosives industry in the Dominion by A. Desborough, H. M. Inspector of Explosives (*C. A.*, **5**, 2950) and of the conference on the proposed legislation to regulate the manuf. importation and testing of explosives. C. E. M.

U. S., 1,005,052, Oct. 3. H. MAXIM, Hopatcong, N. J. **Minimizing the erosive action of the products of combustion of explosives in guns,** by burning the explosive charge in the gun in the presence of indurated grains decomposing with absorption of heat as the combustion of the explosive proceeds and liberating a non-combustible gas for preventing flareback, the grains being composed, *e. g.*, of oxalic acid.

U. S., 1,008,333, Nov. 14. H. HIBBERT, Wilmington, Del. **Making butylene glycol** by condensing acetaldehyde to acetaldol in the presence of ice in contact with the acetaldehyde, gradually adding a strong aq. soln. of K_2CO_3, gradually elevating the temp. during the condensing operation from below 15° (preferably —5°) to not much above 15°, diluting the acetaldol soln. with not more than about 15 parts of H_2O at a temp. not much above 15°, adding an acid to render the soln. slightly acid and then, without isolating the acetaldol, reducing the aq. soln. to butylene glycol by Al amalgam.

U. S., 1,008,615, Nov. 14. G. E. POTTS, Short Hills, N. J. **Stabilizing nitro explosives,** *e. g.*, nitrocellulose, by washing with a 1% soln. of $FeSO_4$, washing with H_2O and then with a 1% soln. of Na_2CO_3.

U. S., 1,008,725, Nov. 14. M. F. LINDSLEY, Kings Mills, Ohio. **Making an explosive** by treating a granulated mixt. of starch and cellulose with about 20% its wt. of oil of mirbane, then nitrating in a bath of HNO_3 and H_2SO_4, neutralizing, drying and waterproofing with oil of mirbane.

U. S., 1,009,577, Nov. 21. F. A. RITSCHKE, Geesthacht-on-the-Elbe, Ger. **Making smokeless gunpowder** containing nitrocellulose and not more than 30% nitroglycerin, without employing other solvents or gelatinizing agents, by heating to about 90° and shaping under a pressure of at least 200 atm.

Brit., 2,682, Feb. 2, 1911. ELEY BROS., Angel Road, Edmonton, London Co. A **detonating composition** for use in rim-fire cartridges, percussion caps, detonators, and the like, composed of fulminate of Hg, a peroxide such as that of Ba, and trinitrotoluene or known substitute therefor, said additions being in substitution in whole or in part for the $KClO_3$ commonly employed.

Brit., 3,879, Feb. 15, 1911. M. MALLETT, 21 and 23 rue Cesar Bertholon, St. Etienne, France. **Increasing the efficiency of an explosive cartridge** by totally or partially covering it with 1 or more plastic gelatinous sheets of explosive substances which adhere to the cartridge and are capable of instantaneously developing the heat and the force necessary in order that the elements of the exposive wrapped up enter into complete reaction. These sheets contain nitroglycerin 46–56%, and cotton collodion 54–44%.

Can., 136,185, Oct. 17, 1911. C. E. GRIFFING and J. F. O'BRIEN, Los Angeles,

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Cal., U. S. A. **Explosives** in which KCl is mixed with $C_{12}H_{22}O_{11}$, comminuted coal and MnO_2.

Can., 136,276, Oct. 17, 1911. L. GRAY, Cleveland, Ohio, U. S. A. **Explosives** in which $C_{12}H_{22}O_{11}$ is mixed with $KClO_3$ and an adhesive such as gum arabic which forms a coating on a binder between the grains.

Ger., 230,274, May 4, 1909. M. BOEHM, Berlin. **Oxyhydrogen blasting cartridge** ignited by means of a direct elec. current. This current decomposes the liquid and produces the oxy-hydro gas, forming under its own pressure. Heretofore only water acidulated with inorganic acids, such as H_2SO_4, has been used. In this invention weak organic acids or salts in soln. are used as the electrolyte, the advantage being that CO_2 is formed also, thereby preventing the flaming of the spark effecting the explosion.

25. DYES AND TEXTIL CHEMISTRY.

L. A. OLNEY.

Theory of Dyeing. Re-solution after Treatment with Acids, etc. W. P. DRAPER AND A. WILSON. *J. Soc. Chem. Ind.*, 29, 1432–4.—The author previously pointed out (*Ibid.*, 1906, 274; 1907, 667) that well-defined differences in the degree of fixation of dyes by fibers come into play when the temp. of the dye-bath is varied, and that these can be recognized by corresponding variations in subsequent re-soln. of the dye from the fiber into selected solvents. The authors in the present paper have extended this work to cover the action of acids when present in the dye-bath. Three series of expts. are recorded: (1) Influence of AcOH in dye-bath, (2) H_2SO_4 replacing the AcOH and (3) dyeing in alk. soln. with acid colors. The present method of dyeing acid colors may be modified in the future to obtain the max. fixing effect.

L. A. OLNEY.

The Relation between Chemical Constitution and Fastness to Light and other Agencies of Polyhydroxybenzophenone Dyes. E. R. WATSON AND J. M. DUTTA. *J. Soc. Chem. Ind.*, 30, 196–7.—These colors possess especial interest because they are the simplest dyes built on the same lines as the important natural dyes of the alizarin, xanthene and flavone series. After making many tests for fastness to various agencies, the authors draw the following conclusions. The group does not show that unvarying fastness to all agencies as was expected from analogy with the alizarin series. The brightening and deepening of shade on treatment with alkali must be regarded as a defect unless the shade once brightened is permanent. This has not yet been tested. The only dye of the group which was practically unaffected by all agencies was 2,3,4,4′-tetrahydroxybenzophenone. The xanthones are not so fast to light or acid as the polyhydroxybenzophenones from which they are derived. This seems to show that there is no special virtue for dyeing purposes in the pyrone ring. L. A. O.

Madder Dyes and Lakes. H. CAJAR. *Z. angew. Chem.*, 24, 793; through *J. Soc. Chem. Ind.*, 30, 635.—Madder lakes are faster to light than those obtained from artificial alizarin. As usually prepared, they are chiefly compds. of alumina and purpurin. They are principally used for artists' colors and are characterized by their high transparency. Lakes from artificial alizarin (with $Al(OH)_3$ and Turkey-red oil) are best prepared on the small scale. The quality improves with the transparency of the $Al(OH)_3$; it is therefore recommended to heat to b. after pptn. of the alumina by alkali hydroxide. The greater the acidity of the alumina the greater is the cover-

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ing power of the pigment. These lakes are used in the manuf. of water- and oil-colors for glass painting, in color-plate printing, and in the printing of paper hangings.

SIDNEY BORN.

Formic Acid: Its Properties and Application in Dyeing and Finishing. T. WALTHER. *Färb.-Ztg.*, **22**, 61–2; through *J. Soc. Chem. Ind.*, **30**, 416.—An account of expts. on the use of formic acid as a substitute for tartar, oxalic acid, and acids such as AcOH, HCl, H_2SO_4, etc., usually employed in mordanting. (*a*) *Dyeing on a mordant:* Using formic acid the same depth of shade is produced by using considerably less dichromate than is required when other acids are used, and the complete exhaustion of the mordanting bath effects economy. The addition of H_2SO_4 to the bath is not necessary, and the goods may be entered dry at the boil with perfectly even results. In mordanting heavily milled goods W. first neutralizes the formic acid bath with NH_3, enters at 70° and after 15–20 min. raises to b. and boils for the required time. The colors produced by the formic acid method are deeper and fuller than those produced by the aid of tartar, besides possessing greater fastness to milling and light. Also the wool is left soft and smooth, while the tartar method leaves it with a harsh feel. For dyeing Eriochrome colors topped with indigo, the following method is recommended: The wool is entered at 70° in a bath containing the necessary amt. of dissolved dye and about 2% of formic acid, and after 15–20 min. the bath is raised to b., boiled for about $^1/_2$–$^3/_4$ hr., 1% more formic acid or 0.5% H_2SO_4 added, and b. continued $^1/_2$ hr. longer. Then 1% of dichromate is added, and after b. $^1/_2$ hr., the wool is rinsed and dyed with indigo. The resulting dyeing possess excellent fastness to light, milling, potting, and stoving. (*b*) *Single-bath method:* By using formic acid the process is rendered both simpler and more rapid. The wool is entered at 50° in a bath containing the dye along with $^1/_4$% of dichromate (on the wt. of dye) and 1% of formic acid, and dyeing continued 15 min. at 50°. The bath is then raised to b., and boiled for 1 hr. Then more formic acid is added, and b. continued until the bath is completely exhausted. (*c*) *Dyeing and development with dichromate:* AcOH and H_2SO_4 may be replaced by formic acid with considerable advantage. The material may be entered at a higher temp., and the bath raised more rapidly to b., without danger of uneven results. The bath is prepared with the necessary quantity of dissolved dye and 1% of formic acid, and the goods previously wetted out (loose wool may be entered dry, at b.) are entered at 60–70°. The bath is raised to b. in $^1/_2$ hr., and kept so $^1/_2$ hr. when 1–2% of formic acid is added, and the b. continued until exhaustion is complete. Then, without cooling, $K_2Cr_2O_7$ ($^1/_8$–$^1/_2$% on the wt. of dye taken) is added and the bath kept b. for $^1/_2$–$^3/_4$ hr. The old bath is neutralized with NH_3 before reusing. (*d*) *Dyeing with logwood, or its coloring matter, hematin:* W. obtained good results by using formic acid instead of H_2SO_4 and oxalic acids, in both the single and 2-bath processes, the dyed goods being much smoother and more glossy, and having a softer feel. The employment of formic acid is especially recommended when calcareous water is used, since oxalic acid is pptd. as CaC_2O_4 by such water. (*e*) *Milling of cloth and goods dyed in the form of loose wool:* The use of formic acid in milling has many advantages over soap. The possibility of formation of Ca soaps when hard water is used is precluded, while the goods are equally smooth and soft. The method of procedure is the same as in the soap method, except that the soap soln. is replaced by one of dil. formic acid, and the duration of the impregnation is longer. Goods dyed in the loose state, with dyes which will not stand milling with soap, may be milled with formic acid without damaging the colors.

SIDNEY BORN.

Electrical Theory of Dyeing. W. W. H. GEE AND W. HARRISON. *Trans. Faraday Soc.*, **6**, 42–70.—Elec. theory of dyeing is based on the fact that any 2 bodies placed in

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contact are oppositly electrified. It explains how one type of coloring matter is selected in preference to another by the fabric. SIDNEY BORN.

Manufacture of Tartrazin. E. A. E. *Rev. chim. ind.*, 22, 221–3.—Brief review of the chem of the manuf. of tartrazin. C. A. ROUILLER.

History of the Coloring of Textils, Dyeing and Printing. M. O. PIEQUET. *Bull. soc. ind. Amiens*, 48, 133–51. MILES R. MOFFATT.

Critical Discussion of the Inconvenience Caused by Mineral Oil Stains on Cloth for Bleaching, and of the Introduction of Unsaponifiable Matter in Sizings. E. BLONDEL. *Bull. soc. ind. Rouen*, 39, 34–9. M. R. M.

The Dye Industry and Chemical Synthesis. J. GUARESCHI. *Rev. gen. mat. color.*, 15, 281–3. M. R. M.

Dyeing with Vegetable Dye. VILLALONGA. *Rev. gen. mat. color.*, 15, 283–5. M. R. M.

Determination of Indigotin in the Presence of Starch. W. THOMSON. *J. Soc. Dyes Colourists*, 27, 49–52; through *J. Soc. Chem. Ind.*, 30, 411.—T. describes expts. on the estn. of indigo in admixt. with starch in various proportions. Rawson's permanganate process with salt pptn. of the Na indigotin disulfonate (*J. Soc. Chem. Ind.*, 1885, 489), always gave a much lower % of indigotin than that actually present, the discrepancy increasing as the proportion of starch to indigotin became greater. Bloxam's tetrasulfonate process (*J. Soc. Chem. Ind.*, 25, 735; 26, 4, 1174), although also giving somewhat low results, was not so much affected by the presence of starch. In both processes the end point in the permanganate titration was not well defined. It was therefore found advizable to remove the starch with HCl before applying either process. L. A. OLNEY.

Dyeing of Paper. ANON. *Papier-fabr.*, 9, 43–4.—Certainty in paper dyeing can be increased by retaining samples of all colored papers with details of comp. of pulp, degree of heating, and colors employed and arranging them according to color. This is also particularly helpful in detg. cost of dyeing. L. A. OLNEY.

Dyeing with Indigo on Cotton in Ordinary Tubs or Vats. JUSTIN-MUELLER. Sealed letter of July 7, 1905 and report on same. *Bull. soc. ind. Mulhouse*, 80, 384–6.—The bath is warmed to 80–90°, 500–1000 cc. of Na hydrosulfite of 14° Bé., indigo (previously reduced with Na hydrosulfite in presence of NaOH), and 3–4 kg. of NaCl per 100 l. of H_2O are added. The well boiled out cotton is entered, given 5 turns, let stand 1 hr., again given 2–3 turns, let stand another hr., then given a turn or two, wrung out well, oxidized in the air, and washed. The process is suitable for light shades on yarn or piece goods but is wasteful of indigo when dark shades are desired.
MILES R. MOFFATT.

Differentiation of Natural Textils and Artificial Silks by Means of Ruthenium Red F. J. G. BELTZER. *Mon. sci.*, 55, 633–41.—The reagent is prepared by dissolving 0.01 g. of $Ru_2(OH)_2Cl_4(NH_3)_7 + 3H_2O$, in 10 cc. H_2O. This soln. is reduced by light. A drop is placed on a slide, the fiber is immersed in it, covered with a coverglass, and examd. microscopically. Nitrocellulose silk is distinguished from cuprammonium and viscose silks by the methylene blue BB test. The Ru red test distinguishes between cuprammonium and viscose silks, the former remaining nearly colorless while the latter are dyed rose. M. R. M.

Weakening of Cotton Yarns Dyed with Sulfide Dyes. F. EPPENDAHL. *Färber-Ztg.*, 22, 44–7, 64–67, 100–2, 126–7, 145–51, 166–8; through *J. Soc. Chem. Ind.*,

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30, 616.—After a lengthy review E. gives the results of a comparative dynamometric expts. on cotton yarns dyed with different sulfide dyes to det. the effect on the strength of the yarn of exposure, (*a*) under ordinary storage conditions for periods varying from 1–19 months, and (*b*) in a warm damp atm. for 14–21 days and on the preventive efficacy of various after-treatments, he concludes that: (1) Some sulfide dyes are more liable to produce subsequent tendering and should never be used. (2) After-treatment of the dyeings with $CuSO_4$ strongly encourages tendering and should never be used. (3) The risk of subsequent weakening of the material can be largely minimized by an after-chroming, and an alk. finishing or on after-treatment of the dyed material with AcONa. L. A. OLNEY.

Studies on Adsorption in Solution. I. Taking up of Acids by Wool. G. GEORGIEVICS AND A. POLLAK. *Monatsh.*, 32, 655–75.—Wool was purified by b. with dist. water, then with warm soap soln. again with water, then ½ hr. with 2% HCl, again washed with water, then with lukewarm, very dil. $(NH_4)_2CO_3$, then with water, with dil. AcOH, finally with b. water and dried in clean air. The air-dried wool was then treated with dilute acids to const. wt. H_2SO_4, HCl, oxalic, succinic and acetic acids were used. The taking up of acids by wool is a case of adsorption which runs between certain limits. Temp. variations have only slight influence on these results. SIDNEY BORN.

Development of Shades on the Fiber by Light Energy. O. BAUDISCH. *Chem. Ztg.*, 35, 1141–2.—B. has discovered new methods for dyeing wool and silk a deep cherry-red by means of light energy and a new substance, *α-nitrosonaphthylhydroxylamine ammonium*. It is best prepd. by reducing α-nitronaphthaline (cf. Willstätter and Kubli, *C. A.*, 2, 2701) with $(NH_4)_2S$ to α-nitronaphthylhydroxylamine; the latter is dissolved in com. ether or benzene, and dry NH_3 passed through the soln. at 0°. When the soln. is satd. add amyl nitrite in excess. The α-nitrosonaphthylhydroxylamine ammonium is pptd. as white plates. Yield, quant. It is rapidly colored red in presence of light, and is best preserved in an atm. of NH_3 in dark. It forms complex salts with Fe and Cu like "cupferron." To dye fabrics, the salt is dissolved in dil. NH_3 and silk or wool is impregnated for 15 min., squeezed fairly dry and lightly steamed. The light yellow silk thus obtained can be kept for a long while in the dark but on exposure to light soon becomes deep cherry-red. SIDNEY BORN.

Some Properties of Starch Relating to its Stiffening Power. W. HARRISON. *J. Soc. Dyers Colourists*, 27, 84–8; through *J. Soc. Chem. Ind.*, 30, 534.—When starch suspensions are heated to just above the swelling point and then cooled, the swelled granules can be sepd. by centrifuging, and the vol. of the deposit is proportional to the viscosity, no matter what starch is used. To compare the stiffening power of different samples of a starch 1% aq. suspensions of each are heated simultaneously to a few degrees above the temp. of swelling (60° for potato starch), with careful mixing but without shaking. After cooling to the ordinary temp., 15 cc. of each soln. are centrifuged in tubes graduated to 0.1 cc. The vols. of the granules deposited represent the comparative stiffening powers. The relation between the viscosity and the vol. of sepd. granules is represented by the equation: Viscosity = 1 + (4.75 × vol. of granules/total vol. of soln). The results obtained compare with those given by a capillary tube viscosimeter are given in the following table:

Starch.	Wheat.		Maize.	Rice.		Potato.	Sago.		Tapioca.		Potato.
Vol. of granules	0.75	1.6	1.7	2.2	2.75	2.9	3.75	4.0	4.4	5.5	5.3
Vis. by viscosimeter	1.23	1.50	1.29	1.70	1.86	1.91	2.21	2.29	2.44	2.8	3.2
Vis. calc. from formula	1.22	1.51	1.54	1.70	1.87	1.92	2.19	2.27	2.40	2.74	2.68

The low result obtained with the viscosimeter in the case of maize starch is found to be caused by the fatty matter present; the results agree if the starch be extracted

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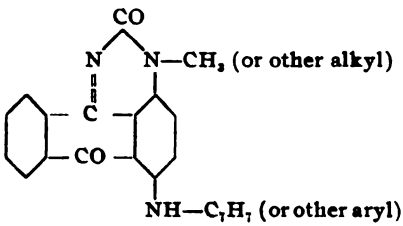
with alc. and ether. Owing to the viscous nature of potato starch solns. the results cease to agree when the viscosity reaches 3. The vols. of the swelled granules deposited is proportional to the amt. of starch used, unless that vol. approaches 100% of the total. As the viscosity increases quite out of proportion to the % of this starch, it is probable that the vol. of the swelled granules represents the stiffening power more accurately. If the suspensions be heated too long or shaken, fine particles may be set free which cannot be sepd. centrifugally, which is also the case with sol. starch. For accurate detns. the granules of starch should be swelled, but no starch should be present in the surrounding liquid. In the case of potato starch the comparison should be repeated several times on account of the great variation in the size of the granules. Alkali, if present, causes high results. As different starches swell at different temps. and the stiffening depends also on the duration of the heating, the above method is not applicable for the quant. comparison of different types of starches. L. A. OLNEY.

Malt Enzymes and their Employment in the Textil Industries. R. J. MAY. *J. Soc. Dyers Colourists*, **27**, 88–92.—Diastatic preps. are used in the following branches of the textil industry: *Sizing*, cotton and woolen warps; *finishing* of various cotton cloths; *stripping and degumming*, the filling even in heavy cloth being removed with comparative ease; *prep. of cloth for mercerization*, preliminary treatment before bleaching; *thickening for printing colors*. Many of the processes of application are given with considerable detail. L. A. OLNEY.

Structure of Flax Fiber and Hemp Fiber. F. REINITZER. *Arch. Chem. Mikroskopie*, **4**, 13–38. (38 plates).—To recognize the properties of the bast cells, the fibers are boiled several min. with 2% H_2SO_4, washed with water and sepd. with a needle. R. describes the microscopic appearance of flax and hemp in great detail. Flax has fine, wavy lines, while hemp has none. The presence of plasma knots and closed cells is characteristic of flax. SIDNEY BORN.

Dimethylaniline and its Derivatives (WALTER). 10.

U. S., 1,004,107, Sept. 26. P. THOMASCHEWSKI, Vohwinkel, near Elberfeld, Ger. Assignor to Farbenfabr. vorm. F. Bayer & Co., Elberfeld, Ger. **Dye**, a sulfonic acid of a compd. probably having the formula:



the Na salt of the product being a violet powder, sol. in H_2O with a violet color and dyeing wool violet; made by heating an 1-alkylamino-4-arylaminoanthraquinone with urea and a condensing agent.

U. S., 1,004,136, Sept. 26. E. BEK, Schaffhausen, Switzerland. **Preliminary treatment of flax fibers for the manufacture of cloth**, consisting in sepg. the woody parts from the valuable fiber, scouring the fibers in a lye prepared from Na_2S and a vol. oil, *e. g.*, "rosulfon," for about 1.5 hrs., removing the scoured fibers from the lye and

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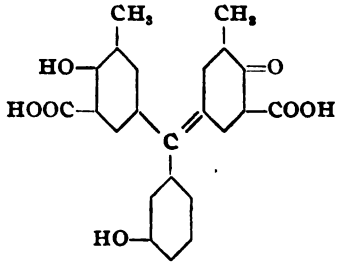
storing them under a cover until they are subjected to a fermentation process and gliadin is sepd. from the fibers, and then rinsing and drying the fibers.

U. S., 1,004,433, Sept. 26. M. H. ISLER, Mannheim, Ger. Assignor to Badische Anilin & Soda Fabrik, Ludwigshafen-on-the-Rhine, Ger. **1,1'-Dianthraquinonyl-2,2'-dialdehyde**, made by treating 1-chloroanthraquinone-2-aldehyde with Cu powder, the product being insol. in caustic alkali soln., sol. with a reddish color in conc. H_2SO_4, difficulty sol. in most of the ordinary solvents but sol. in hot solvents of high b. p. and yielding with hydrosulfite a red vat which dyes cotton fast orange shades.

U. S., 1,004,486, Sept. 26. W. R. SMITH, Buffalo, N. Y. **Apparatus for dyeing yarn or thread.**

U. S., 1,004,609, Oct. 3. MAX WEILER, Elberfeld, Ger. Assignor to Farbenfabr. vorm. F. Bayer & Co., same place. **Dye**, probably having the formula



in which 2 atoms of Br are substituted in the hydroxybenzene nucleus, a red powder sol. in hot H_2O with a red color, sol. in NaOH soln. with a violet color, dyeing chromed wool greenish blue shades; made by condensing dibromo-*m*-hydroxybenzaldehyde with *o*-cresotinic acid and oxidizing the leuco compd.

U. S., 1,004,610, Oct. 3. *Idem.* **Dye**, probably having the formula given in U. S. Pat. 1,004,609, except that Cl instead of Br is substituted in the hydroxybenzene nucleus, the product being scarlet-red and dyeing chromed wool pure blue shades.

U. S., 1,004,974, Oct. 3. P. BIRKENSTOCK, L'Arbresle, France. **Obtaining batting and yarn as a substitute for cotton** by treating raw decorticated ramie in a bath formed of NaOH, Na_2CO_3 and Na, sulforicinate washing in acidulated cold H_2O and then in pure cold H_2O, drying, breaking and beating the material to render it supple, cutting to the length desired, sepg. the fibers, curling the batting so obtained by treatment in a cold H_2O bath containing NaOH and Na, sulforicinate drying, washing in acidulated H_2O and then in pure cold H_2O, drying, sepg., spreading and finishing the batting or spinning the material as in the case of cotton.

U. S., 1,008,063, Nov. 7. W. D. PUSEY, Woodlupine, near Perth, Western Australia. **Preserving milk** by placing in sterilized bottles, closing them with sterilized corks, completely immersing the bottles in tepid H_2O, heating to 100° and retaining at this temp. for some time, allowing the H_2O to cool to normal temp. and sealing the bottles with wax after removing from the H_2O.

U. S., 1,008,249, Nov. 7. E. ELSÄSSER, Langerfeld, Ger. **Treating wool to increase its gloss** by heating with so strong a soln. of alkali metal bisulfite that the wool tends to shrink and assumes a rubber-like condition, allowing it to shrink, stretching it afterward and keeping it stretched until the shrinkage action of the bisulfite has stopped.

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U. S., 1,008,251, Nov. 7. W. H. FLETCHER, Paterson, N. J. **Skein-dyeing apparatus.**

U. S., 1,008,332, Nov. 14. S. M. HERMANN, New York, N. Y. **Composition for giving scroop and luster to fabrics,** consisting of a soln. of lactic acid, tartaric acid, HOAc, H_3PO_4, HCl, salicylic acid, gallic acid, amyl acetate, oil of mirbane, H_2O, soap and Na silicate to be added to a hot bath of soap and olive oil containing the fabric under treatment.

U. S., 1,008,413, Nov. 14. A. HUILLARD, Paris, France. **Bleaching piece goods** by stacking them flatwise in a vat, maintaining the stack against displacement and circulating bleaching liquor through the goods, transversely, first in one direction and then in the reverse direction.

U. S., 1,008,613, Nov. 14. I. E. PALMER, Middletown, Conn. **Dyeing spun warp yarn** while twisted at intervals along a chain made up of a series of spun warp threads.

U. S., 1,008,906, Nov. 14. W. HERZBERG and W. BRUCK, Schöneberg, near Berlin, Ger. Assignors to A. G. für Anilin Fabrn., Berlin. **Dye,** the brominated α,β-anthraquinoneacridone, made by acting on α,β-anthraquinoneacridone, dissolved in $PhNO_2$, with Br, the product being a blue-red powder which produces on cotton from a vat containing hydrosulfite and alkali an intense clear fast red, nearly insol. in alc. and C_6H_6 and difficultly sol. in $PhNO_2$, aniline and pyridine to a blue-red soln. and sol. in conc. H_2SO_4 to an orange-yellow soln. which on the addition of ice seps. blue-red flakes.

U. S., 1,008,907, Nov. 14. W. HERZBERG and MAX RONUS, Berlin, and F. SCHWABE, Charlottenburg, Ger. Assignors to A. G. für Anilin Fabrn., Berlin. **Monoazo dye** derived from 4-nitrodiazobenzene-2-sulfonic acid and 1,3-diaminobenzene-2,5-disulfonic acid, dyeing wool from an acid bath red tints, being a red powder, sol. in H_2O to a red soln. which is not altered by an alkali or HOAc but turns to yellow on the addition of HCl, sol. in conc. H_2SO_4 to a red soln. and yielding with reducing agents 1,3,4-triaminobenzene-2,5-disulfonic acid and 1,4-phenylenediaminesulfonic acid.

U. S., 1,008,908, Nov. 14. W. HERZBERG and W. BRUCK, Schöneberg, near Berlin, Ger. Assignors to A. G. für Anilin Fabrn., Berlin. **Dye,** anthraquinonebenzoylaminoacridone, $C_6H_4(CO)_2C_6H_2.NH.CO.C_6H_3.NH.CO.C_6H_5$, a dark bluish violet powder, insol. in the usual solvents, very slightly sol. in $PhNO_2$ but sol. in conc. H_2SO_4 to a yellowish red soln. and yielding with alk. hydrosulfite a violet vat which dyes cotton violet changing to blue on treatment with hot soap soln.

U. S., 1,009,019, Nov. 14. M. BRODKOWSKY, Milwaukee, Wis. **Separating hair from hair-cloth** by treating the cloth with a soln. of PhOH, drying by heat until the vegetable fibers are weakened and rendered brittle and then agitating the cloth until the hair separates from it.

Ger., 228,985, Sept. 12, 1909. FELTEN & GUILLCAUME LAHMEYERWERKE AKT. GES., Frankfurt a/M. App. for **bleaching textils,** especially woven ware, by means of O_3, by passing the moistened cloth through an O_3 chamber.

26. PIGMENTS, RESINS, VARNISHES AND INDIA RUBBER.

A. H. SABIN, THEODORE WHITTELSEY.

Paints and Pigments. A. H. SABIN. *J. West. Soc. Eng.*, **16**, 1 (illust.).—A description of the processes of manuf. of slow-corroded white Pb, of litharge and of red

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Pb; a review of recent paint test work, and a chem. consideration of paint materials. HORACE C. PORTER.

Consistency of Paints by the Stormer Viscometer. ALLEN ROGERS AND A. H. SABIN. *J. Ind. Eng. Chem.*, 3, 737.—Forrest's modification of the Stormer viscometer is suitable for use with paints, which are compared with 95% glycerol as a standard. Description of the instrument is given. A. H. SABIN.

Analysis of a Resin Found in an Egyptian Coffin. REUTTER. *Compt. rend.*, 156, 597–9.—Besides small pieces of rock and sand, chips of cypress or cedar, and Na_2CO_3, it consists of styrax resin, Aleppo balsam, mastic and asphaltum. Color brown; not homogeneous. A. H. SABIN.

Analysis of Turpentine Oil. C. BLAREZ. *Ann. chim. anal.*, 16, 328–36.—Detns. were made of the *d*-rotary power, temp. of miscibility with analine, and n of several fractions as well as the original oil. 100 cc. of the oil were distilled, and 4 fractions of 20 cc. collected, the residue being taken as the fifth. As little as 2.5% of an adulterant can be detected when present alone or with several others. R. E. HUMPHREYS.

Test for Alcohol in Oil of Turpentine (French). R. MASSY. *Rev. chim. ind.*, 22, 285–6.—By sp. gr. A. H. SABIN.

Vulcanization. B. BUIZOV. *Caoutchouc and Gutta-percha*, 8, 5291; cf. *C. A.*, 5, 2571, 2977, 3170.—The exothermic character of vulcanization, as claimed by Weber cannot be considered as proved. On burning a mixt. of caoutchouc with 25% S before and after vulcanization, B. obtained the same heat of combustion, showing that vulcanization had not changed the total energy. To det. if heat was given off during vulcanization, mixts. of caoutchouc and S were heated in an air bath; below 150° no elevation was observed. When this mixt. was placed in a S bath at 160°, its temp. rose quickly to 225°, H_2S was given off and a porous tough substance resulted. Similar results were obtained by heating the same mixt. in aq. soln. of $CaCl_2$. Chemical reaction between caoutchouc and S has nothing to do with vulcanization, which is wholly a physical phenomenon. He disagrees with Weber's idea that the energy evolved by Cl suffices to start the reaction of S with caoutchouc in cold vulcanization but, from expts. cited, thinks a complicated adsorption takes place. W. W. EVANS.

Determination of Caoutchouc as Tetrabromide. D. SPENCE AND J. C. GALLETLY. *Caoutchouc and Gutta-percha*, 8, 5313–6; cf. *C. A.*, 5, 3172, 3631.—Method: 0.01–0.5 g. of tetrabromide was mixed in a Pt crucible with about 1 g. of Na_2CO_3–KNO_3 mixt., a layer of the latter placed on top and then heated to redness for $^1/_2$ hr., fusion being avoided. The cooled mass was then dissolved in water, filtered and the Br detd. gravimetrically. The results were slightly higher than by Carius method, due to presence of small quantity of some Ag salt not decomposed by dil. HNO_3. Making the soln. distinctly acid before pptn. with $AgNO_3$ overcomes this tendency in both cases and gives satisfactory results. The method is recommended for practical use. W. W. E.

MARZAHN, R.: **Matières premières de la fabrication du caoutchouc, de la gutta-percha et des industries connexes.** Paris: 8°, 358 pp., 12 Fr.

MCINTOSH, J. G.: **The Manufacture of Varnishes, and Kindred Industries.** 2nd Ed., Vol. III. London: Scott, Greenwood, 8°, 492 pp., 12s. 6d.

U. S., 1,004,078, Sept. 26. A. S. RAMAGE, Buffalo, N. Y. **Making paint or printing ink by** pptg. a metallic soap, *e. g.*, Pb stearate or oleate, in the presence of a pig-

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ment, *e. g.*, chrome yellow, drying and m. the mixt. and compounding it with a vehicle, *e. g.*, linseed oil.

U. S., 1,004,125, Sept. 26. F. D. WILLEY, Chicago, Ill. **Composition for coating wood, metal, etc.,** consisting of Al powder 2 oz., white lead ground in oil 1 lb., dry white lead 1.5 lbs., pumice flour 2 oz., "Keystone filler" 3 lbs., "English filler" 1.5 lbs., varnish 1 qt., japan 1 qt. and turpentine 1 qt.

U. S., 1,004,385, Sept. 26. A. F. DECKER, New York, N. Y. **Printers' blanket** having a body layer of ground cork mixed with linseed oil, rosin and gum, and sep. fabric facings closely adherent to the body layer on both sides and permeated with the linseed oil, rosin and gum, these ingredients being in the facings in a partially dried state so that the facings and edges of the blanket are rendered impervious to printers' ink.

U. S., 1,004,865, Oct. 3. J. R. GAMMETER, Akron, Ohio. **Vulcanizing rubber tubing** by inflating it, wrapping a band spirally about the tubing and simultaneously feeding the wrapped portion of the tubing through a vulcanizer at the same rate that the band is applied.

U. S., 1,007,973, Nov. 7. P. RECKOW, Chicago, Ill. **Forming a veneered surface** by coating a surface of veneer with a soln. of pyroxylin and camphor in amyl acetate, alc. and acetone and then gluing the coating and veneer to the supporting base.

U. S., 1,008,434, Nov. 14. A. S. RAMAGE, Buffalo, N. Y. **Making paints** by compounding a pigment with a metallic soap, *e. g.*, chrome yellow with Pb soap, in the presence of H_2O and then displacing H_2O from the resulting mass by mixing it with oil or other paint vehicle.

U. S., 1,008,607, Nov. 14. F. E. MELLINGER and H. H. MARKLEY, Lumija, Mexico. **Machine for converting latex into sheets of crude rubber.**

U. S., 1,009,547, Nov. 21. H. MISAKI, San Francisco, Cal. **Composition for polishing furniture,** consisting of cottonseed oil 15 gals., white of eggs 17 lbs., yolk of eggs 23 lbs., CH_2O soln. 2 oz. and alc. 1 oz.

U. S., 1,009,708, Nov. 21. E. W. ENEQUIST, Brooklyn, N. Y. **Obtaining an oil and pigment** by dissolving melted petroleum tailings in light hydrocarbon oil, permitting the same to settle and obtaining a pigment ppt. which is then sepd. from the oil.

Brit., 8,987, Apr. 11, 1911. F. W. HOWARD, 509 W. 161st St., N. Y. **Resoftening vulcanized rubber** by subjecting it to the action of heated vegetable oil.

Can., 136,538, Oct. 31, 1911. W. F. DOERFLINGER, New York, N. Y., U. S. A. Process of **making varnish** by dissolving $C_{12}H_{10}O_4(OCH_2CO)_6$ in alc.

Ger., 229,181, Oct. 30, 1907. H. ENGELHARDT, Lhöneberg-Friedenau. Production of white, or colored, **weather-resisting painting** on roofing paper, unaffected by the tar. First a layer of rosin and silicates insol. in water is put on the paper and then the roofing paper is painted white or colored. As silicates insol. in water, cement is preferable, less so fuller's earth, kaolin and infusorial earth. The silicates can be admixed directly with the soln. of rosin, or the roofing paper may be painted first with the rosin, sifting the silicates upon the same, and then painting again with rosin oil.

Ger., 229,566, Jan. 9, 1907. E. JOSS, Granshorrn, Belgium. **Preparing wood surfaces for printing with fatty colors.** The wood is provided with a transparent fat-absorbing coating of caoutchouc alone or in combination with a soln. of wax and

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Canadian balsam in turpentine, linseed oil, and benzene, the wood being therby covered, as in the treatment of tanned colloids, with an insulting interposed layer which prevents a penetration or a running off of the color. The connection is so intimate that the fatty color can only be removed by fat-dissolving agents which also dissolve this layer. Washing with warm water does not influence the color at all.

27. FATS, FATTY OILS AND SOAPS.

E. SCHERUBEL.

Butyrometer for Determining the Fats of Cream or Cheese (Gottlieb-Roese Method). C. BRIOUX. *Ann. chim. anal.*, 16, 373–6.—The app. of Gottlieb-Roese has been modified thus: A tube graduated in 0.1 cc. with bulb at bottom is joined to another tube, also graduated and with bulb, at an angle of about 60°. The upper portion of app. contains a glass stopper and a small outlet tube, the stopper connecting with outlet by an opening which can be brought to coincide by turning. The object of the inclined tube is to permit decantation of ethereal soln. of fat without disturbing H_2O soln. below. The procedure for milk is as follows: 10 cc. are introduced into the butyrometer and 1 cc. of NH_4OH soln. added and agitated for 1 min. to dissolve casein. Then 10 cc. of 95% alc. are added and the mixt. brought into central bulb and agitated. Next 25 cc. of ether are added and the whole again shaken, when 25 cc. of petroleum ether, d_{15} 0.65, are added and the shaking repeated. The app. is allowed to stand 1–2 hrs. and the vol. of the ether-alc. soln. detd. A portion is then poured into a tared beaker and the vol. again read. After evapn. of ether, the residue is weighed and the % fat calc. The procedure for milk and cream is similar, except that the casein is made sol. with NH_4OH soln. before introducing into the app. E. SCHERUBEL.

Plant Wax from Mexico. NIEDERSTADT. *Chem. Ztg.*, 35, 1190.—Candelilla wax. E. S.

Annual Review in the Field of Fats, Oils and Waxes for 1910. W. HERBIG. Chemnitz. *Chem. Rev. Fett-Harz-Ind.*, 18, 179–84, 207–10, 234–8, 262–4.—Continuation of *C. A.*, 5, 3176. P. ESCHER.

Viscosity Determination of Small Quantities of Oil in Engler's Viscosimeter. OFFERMANN. *Chem. Rev. Fett-Harz-Ind.*, 18, 272–5.—Holde and Gans have established the following factors to calc. viscosity results to the normal quantity of 200 cc. when only a small amt. of oil is available to be tested in Engler's viscosimeter. Filling of viscosimeter in cc., flow in cc. and factor are, resp.: 45, 20, 7.25; 45, 25, 5.55; 50, 40, 3.62; 60, 50, 2.79; 120, 100, 1.65. O. has extended this table for still smaller quantities of oil and finds that cylinder oils require a different factor from machine oils, as follows:

Machine oils.				Cylinder oils.			
Filling. cc.	Flow. cc.	Temp.	Factor.	Filling. cc.	Flow. cc.	Temp.	Factor.
50	20	50°	7.27	50	20	50°	7.20
50	20	20°	7.27	50	20	100°	7.46
25	10	50°	13.07	25	10	50°	12.90
25	10	20°	13.03				

P. ESCHER.

System: Palmitic Acid, Sodium Palmitate. F. G. DONNAN AND A. S. WHITE. *J. Chem. Soc.*, 99, 1668–79.—The investigations made cover the system of palmitic acid—sodium palmitate over a range of comps. from the pure acid to a mixt. containing about 38% of the salt, corresponding with the temp. range of 60–82°. The solid

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phases which sep. under these conditions consist of 3 series of solid solns. No solid phases corresponding with definit compds. sepd. For details of method and app. used see the original. E. SCHERUBEL.

The Manufacture of Linoxyn. FELIX FRITZ. Bremen. *Chem. Rev. Fett-Harz-Ind.*, 18, 247–9, 265–7; 9 illust.—Walton's procedure as now generally practiced is described: After H_2O and slimy impurities settle in tanks the oil is fed to b. tanks where it is heated for 6 hrs. to 200°. At 130° (before all the H_2O is driven off) 2% PbO is added and the whole stirred; during or after b. compressed air is blown through; then the oil is stored. In the oxidation house the oil is fed over cotton cloths 2 inches apart 2 or 3 times a day; temp. of the house 40°. Fresh air is constantly supplied by well regulated ventilation. A peculiar phenomenon during oxidation is the sepn. of the glycerides of oleic acid from those of the unsatd. acids, the latter absorbing O and adhering to the cloths while the former run off to the slanting floor to be mixed with fresh oil and pumped over the cloths again until they also thicken and remain as flocks and lumps on the floor to the amt. of 8–10%. The linoxyn layer on the cloths is about 2 cm. thick after 4 mo. when the cloths are cut down and the linoxyn is removed. A sprinkling of chalk prevents sticking of the cloths. The linoxyn has a sp. gr. of 1.1013, is of amber color, has an acid odor and melts with increasing difficulty the greater its oxidation; it swells in alc. ether, CS_2 and amyl acetate without dissolving but is partially sol. in benzene at lower oxidations. Short descriptions are also given of a later Walton process, of Bedford's and of Genthe's methods and of Parnacott-Taylor's polymerization process which produces a black linoxyn. Ultimate analyses of the various products are tabulated, showing a variation in O content from a min. of 15.64 to a max. of 28.9%. P. ESCHER.

Soy Bean Oil. M. N. CHERCHEFFSKY. *Ann. chim. anal.*, 16, 376–7; *Rev. chim. ind.*, 22, 312. E. SCHERUBEL.

Determination of the Iodine Number of Oils and Fats by Means of the Bromine Thermal Test. C. STIEPEL. *Seifenfabr.*, 31, 349–52, 393–6, 421–3, 445–7, 473–4, 501–2, 525–7. E. S.

Technical Crystallography of Stearin. H. DUBOVITZ. *Seifensieder Ztg.*, 38, 1164–6, 1208–9. E. S.

Distillation in the Stearic and Soap Industries. C. HAJEK. *Seifensieder Ztg.*, 38, 1166–7, 1207–8. E. S.

Japan Wax. E. TASSILLY. *Mat. grasses*, 4, 2283–6; see *C. A.*, 5, 2983. C. R. BRAGDON.

Knotberry Oil (GRIMALDI). 12.

SABATIER, P. AND PELLET, M.: **Essais d'huiles usagées.** Paris: 8°, 16 pp., 2.25 Fr.

U. S., 1,004,034, Sept. 26. E. C. KAYSER, Cincinnati, Ohio. **Preparing a catalyzer for converting unsaturated fatty acids into saturated compounds** by pptg. an insol. reducible Ni compd., *e. g.*, $NiCO_3$ or $Ni(OH)_2$, in and upon kieselguhr, drying and comminuting the product after washing out the sol. salts formed during the pptn. and reducing the powder with H.

U. S., 1,004,035, Sept. 26. *Idem.* **Hydrogenizing fatty acids, or their esters,** by bringing films or spray of a mixt. of the acid or ester and a pulverulent catalyzer into intimate contact with a compressed atm. containing H.

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U. S., 1,007,680, Nov. 7. C. ELLIS, Montclair, N. J. **Making a free-lathering, non-coherent soap powder** by saponifying coconut oil with twice the amt. of KOH and NaOH necessary for its sapon., adding free fatty acids to neutralize the excess alkali after complete sapon., agitating with air, drying and grinding.

U. S., 1,008,474, Nov. 14. E. C. KAYSER, Cincinnati, Ohio. **Hydrogenizing fatty acids and their esters** by repeatedly projecting into an atm. of compressed H portions of a heated mixt. of fatty acid or ester and a pulverulent catalyzer consisting of a light, voluminous, finely-divided inert support, *e. g.*, kieselguhr, impregnated with an active metal, *e. g.*, Ni.

28. SUGAR, STARCH AND GUMS.

A. HUGH BRYAN.

Viscosity of Saccharin Solutions. P. ÖRTH. *Bull. assoc. chim. sucr. dist.*, **29**, 137–48.—By theoretical reasoning the formulas $\log(\log\eta) = \log(\log A) + x\log B + t \log C$ (for pure sugar solns.) and $\log(\log\eta) = \log(\log A) + t \log C + (x + Kn) \log B$ (for impure) are deduced. (A, B, C are consts.; η = viscosity; x = conc. of sucrose; t = temp.; n = conc. of non-sugar; and K = log D/log B). By a large no. of detns. the consts. were approx. found, and the equations are then given as follows: Log ($\log \eta$) = $0.069498 - 2 - 0.009818782t + 0.03381935(x + Kn)$. $100K = 156.89 - 0.81586m + (0.0187228m - 1.38441)t$. ($m$ is true % total solids). Limits of temp. 20°–90°, of total solids, 65–82%, of sucrose conc. 60–76%. The viscosity was found to increase rapidly with falling temp. (especially at high concs.), and with increasing conc. (esp. at low temps.). The viscosity of non-sugar was found to be 96½% that of sugar for the products examd. WM. E. CROSS.

Estimation of Sugar and Lime in Press Cake. H. PELLET. *Betterave*, **21**, 8.—P. agrees with Lindet (*C. A.*, **5**, 3178) in the use of PhOH for press cake analysis. A. H. BRYAN.

The Behavior of Invert Sugar in Alkaline Solution in the Presence of Hydrogen Peroxide. ADOLPH JOLLES. Vienna. *Biochem. Z.*, **36**, 389–93.—The *l*-rotation of invert sugar is reduced in an alk. soln. of H_2O_2 and may be brought in a few hrs. to 0 or even to a weak positive rotation. D. D. VAN SLYKE.

Estimation of the Salt Content in 100 kg. of Molasses or Waste Water from its Salt Coefficient. SAILLARD. *Circ. hebdomadaire*, June 1911, 25; through *Deut. Zuckerind.*, **36**, 813.—With a weak acid fermentation, one can obtain from 100 kg. of molasses, having 50% sugar and a salt coeff. of 5, about 10 kg. of com. salt containing 48 to 50% K_2CO_3. With a stronger acid fermentation, the resulting salt will be lower in K_2CO_3 but higher in K_2SO_4. The % of salt obtained with different salt coeffs. is shown. A. H. BRYAN.

A Serious Error in the Analysis of Beets. FRANZ SACHS. *Sucrerie belge*, **60**, 57.—The use of the Kiel rasp causes a considerable drying of the pulp by the heating due to the rasping itself and the currents of air caused by the rotation of the rasp. This error amts. to 0.4–0.8%. A. GIVEN.

The Purification of Raw Beet Juices and the Quality of Sugar Manufactured. J. WEISBERG. *Sucrerie belge*, **60**, 35.—A discussion of the poor quality of sugar made at times in all European beet-producing countries, the yield compared with the sugar in the beet, and the agents used for purifying the juices. A. GIVEN.

The Undetermined Losses in Sugar Factories. IV. How One Should Proceed in

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Order to Obtain by Inversion a Polarization which will Give by this Means the Exact Amount of Crystallizable Sugar. H. PELLET. *Sucrerie belge*, 60, 3.—A discussion of the errors in the usual method of applying the Clerget polarization, the sources of those errors, and the means of overcoming them. Those methods giving correct results are: (1) That of Pellet, using SO_2 for pptg. the Pb; (2) of Andrlik, using a soln. of urea-HCl; and (3) the inversion by means of invertase as set forth by O'Sullivan and Thompson. The results and reasons for these methods are discussed in detail.
A. GIVEN.

The Use of Centrifugal Pumps in the Sugar Industry. LINDEMANN. *Deut. Zuckerind.*, 36, 811–2. A. H. BRYAN.

Notes on this Year's Campaign. F. P. PILLHARDT. *Deut. Zuckerind.*, 36, 812.—A discussion of the alkalinity of sugars and of juices. A. H. B.

An Economy in the Use of Multiple Effects. J. HENDRICKX. *Sucrerie belge*, 60, 58.—It is suggested that the condensed water instead of being at once removed from the app., by pump or otherwise, be circulated from body to body so as to give up all its heat down to the temp. of the water finally discharged to the boiler feed tank. The saving is calc. to be about 40 cal. per kg. water evapd. A. GIVEN.

The Shipment of Beets in Air-tight Sacks. FRANZ SACHS. *Sucrerie belge*, 60, 28.—Results of expts. in shipping beets for analytical purposes between the various Belgian government labs. In the short distances shipped (with time, 3–18 hrs.) the loss of moisture was reduced so as to be practically without effect on the analysis.
A. GIVEN.

Gum of Khaya madagascariensis. A. GERARD. *Bull. sci. pharmacolog.*, 18, 148–51.—A pale yellow, odorless and tasteless gum, partly sol. in H_2O and pptd. by neutral and basic $Pb(OAc)_2$. It contains 21% H_2O, 4.64 ash, an oxidase and peroxidase, emulsin, tannin, galactans, pentosans. Arabinose and galactose are split off on heating with 6% H_2SO_4 in an autoclave. Starch is absent. V. K. CHESNUT.

Properties of Starch for Stiffening (HARRISON). 25.

U. S., 1,004,176, Sept. 26. R. S. KENT, Brooklyn, N. Y. **Kiln for revivifying bone-black** (after use in removing coloring matter from sugar solns.).

U. S., 1,007,782, Nov. 7. F. L. JEFFERIES, Granite City, Ill. **Steeping grain for the manufacture of starch** by maintaining sep. bodies of steeping liquid in contact with sep. bodies of grain for some time and periodically changing the liquid from one body of grain to another so that as the bodies of liquid become more satd. they are applied to fresher grain.

U. S., 1,007,783, Nov. 7. *Idem.* **Apparatus for carrying out the process of 1,007,782.** (Preceding abstr.)

U. S., 1,007,784, Nov. 7. *Idem.* **Obtaining starch** by reducing grain to finely divided form and subjecting it, mixed with liquid, to a succession of sepg. operations in rotary reels in which the tailings are washed by starch liquor obtained from the next succeeding step of the preceding operations on another batch of material.

U. S., 1,007,785, Nov. 7. *Idem.* **Apparatus for carrying out the process of 1,007,784.** (Preceding abstr.)

U. S., 1,007,823, Nov. 7. F. TIEMANN, Berlin, Ger. **Compressing precipitates** (*e. g.*, from sugar juices) **in settling vessels** by creating a downward current of liquid

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in the vessel so that the pressure on the slimes or ppts. is continually increased, rising counter-currents being established in the main current which carry off the purified liquid from the vessel at different levels.

U. S., 1,009,615, Nov. 21. S. WYNBERG, Amsterdam, Netherlands. **Subjecting sugar-cane stalks to a vibratory action to break off the wax** and simultaneously treating the stalks with a current of air, and collecting the wax.

Ger., 229,264, March 31, 1910. E. PREISSLER, Hannover-Linden. **Device for collecting floating substances, especially in sugar solutions and waste-liquors.**

Ger., 229,597, Feb. 21, 1908. H. HILLEBRAND, Werdohl. **Box with double knives for beet slicing machines** and the like.

Ger., 229,665, June 24, 1909. MANHMENFABRIK GREVENBROICH. **App. for filling sugar plate molds.**

29. LEATHER AND GLUE.

WALTER J. KEITH.

Analysis of Chrome Leathers. W. FAHRION. *Collegium*, 1911, 205–6, 310–1, 366–8.—The ratio Cr_2O_3 : SO_3 is used to rate proper de-acidifying of the leather. According to Stiasny, the salt $Cr(OH)SO_4$, ratio 0.95 : 1, has max. tanning power. F. found earlier 1.56 : 1 in chromed hide powder and in the leather analyzed here, 1.48 : 1. His analytical process consists in heating with alc. NaOH, acidulating with HCl, evapg. to dryness, extracting with H_2O, and detg. Cr and SO_3 according to the usual methods. Replying to Grasser (following abstr.) the ratios may vary to some extent, but practical working limits might be detd. HCl, if present, may be allowed for in analysis. Grasser's method is likely to return some acid formed by action of alkali upon hide substance. His analysis quoted of 0.9% free acid shows the result of hide decomp. for this amt. of free H_2SO_4 would not be permissible in good leather. It is desirable that by analysis of various good typical leathers normal limits for the Cr_2O_3 : SO_3 ratio be found for standard comparison. W. J. KEITH.

Analysis of Chrome Leather. GEORG GRASSER. *Collegium*, 1911, 247–8, 365–6. —G. criticizes the method of Fahrion (see preceding abstr.) as taking no account of HCl which is often used instead of H_2SO_4. His own method (*C. A.*, 5, 2756) gives acid direct, without regarding the uncertain Cr_2O_3 ratio. Factory analyses of 100 g. untreated hide gave 1.815, 1.802, 1.695 and 1.530 g. free acid (as H_2SO_4); after de-acidifying, 0.902, 0.927, 0.853, and 0.645 g. were found. W. J. KEITH.

Leather Rendement and Analysis. L. JABLONSKI. *Ledertechn. Rundschau.*, 1911, 41–3.—The rendement no. by analysis (v. Schroeder) is of no practical use to the tanners but the tannage no. is useful in giving ratios. Hide samples vary in comp. according to location and neither does an av. correctly represent the whole, the variations amounting to 33%. J. analyzed carefully oriented portions of hides and plotted the results. These give a "curve" which is typical for a given animal. From analysis of a located sample, conclusions may be drawn concerning the entire hide.
W. J. KEITH.

Behavior of Tannins in Presence of Albumin and Metallic Salts. GEORG GRASSER. *Collegium*, 1911, 185–92, 190–200.—Dil. tannin solns. were mixed with an equivalent amt. of the desired salt (tannin dibasic, 1.6 g. = 1.7 g. $AgNO_3$), the product generally remaining sol. in water. On addition of albumin, ppts. were obtained containing all 3 reagents. These were analyzed for metals, albumin (Kjeldahl) and tannin by

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difference. Tabulated results are given for compds. obtained with various metals, also Br and I; the albumin ranges from 21 to 60%, the tannin 34–64%. Results are also quoted for 8 familiar tanning materials; they are not distinctive enough for identification purposes. W. J. KEITH.

Progress in Leather Making in America. ALAN A. CLAFLIN. Avery Chem. Co., Boston. *Shoe Leather Rep.*, 103, 12–33.—C. discusses the development and predicts that the leather of the future probably will be made by filling the hide and then adding some material which will render the hide and the filling substance insol.

J. S. ROGERS.

Oddities in Tanning Agents. H. W. KILLE. *Hide and Leather*, 42, 16–34.—K. gives a no. of methods for the tanning of leather by use of different materials. The use of the following materials is briefly described: Bog peat; sawdust, from oak and other woods; leaves and berries from the mastic tree; sea squill or sea onion, wood and bark of chestnut tree; combination of an ext. of oak, birch, catechu or sumac with a decoction of linseed, colza, lichen, marine moss, tallow, olein or other fatty matter, and solns. of salts such as Fe chloride, $Al_2(SO_4)_3$ or $Cr_2(SO_4)_3$, together with antiseptics such as creosote or pinic acid; sweet fern alone or with a bark, with or without cutch or gambier; American pearl ashes and valonia ext.; distillate from resin oil; mixt. of India rubber and sugar of Pb dissolved in oil or spirit; pomegranate bark and roots; birch bark, $CuSO_4$, Glauber salts, catechu, and small amt. of H_2SO_4; mangrove bark; tar, to which turpentine oil, pine oil or phenol had been added; asphodel plant; horse dung; citric and lactic acids, sugar of milk and albuminoids; coal treated with aq. solns. of caustic alkali, alkali carbonate, metallic sulfide, sulfate or hydroxide; tea dust or waste. J. S. ROGERS.

The Chemical Characteristics of Leather in Relation to the Amount of Mineral and Organic Matter it Contains. BALDRACCO. *Leather*, 3, 760.—Adulteration of leather is due to the presence of (1) $BaCl_2$, $BaSO_4$, $MgSO_4$, etc., and (2) glucose, molasses, dextrin, etc. Ash above 2% indicates adulteration. Equipment for French, Belgium and Italian armies limits the mineral matter (ash) to 1.0%, 0.5% and 2.0%, resp. It is proposed to fix the limit of mineral ash at 3%. 1.4% has been considered a max. for glucose and like materials in unadulterated leather. Surface dressing is not called adulteration, and in order to allow for this it is purposed to set the limit for glucose, dextrin, etc., at 4%. J. S. ROGERS.

Leather Mold. JAMES SCOTT. *Shoe and Leather Reporter*, 104, 2, 61.—Molds and mildews occur on leather when it is left stacked in a semi-dry condition for several days, provided that the spores necessary to their growth are present. They grow rapidly on the surface of tan liquors which have been left stagnant for a few days; also on pickled goods, particularly those pickled with H_2SO_4 and salt. Several photomicrographs showing different species of growths on leather are given. The spores may pass through the stages of tanning without being destroyed. As a preventative or curative, it is stated that wiping the leather with a cloth which has been soaked in an antiseptic soln. such as formic or carbolic acid and then wrung out, gives good results. J. S. ROGERS.

The Mellowness of Tan Liquors. "MASC." *Shoe and Leather Reporter*, 104, 5-69.—The term mellowness is usually employed to signify the condition of liquors when they have been used for a considerable time. The opposit condition, astringency, is the readiness with which the tanning material combines with hide to form leather. It is usually accompanied with the power to draw the grain of the hides. Some liquors, as gambier, already possess mellowness without aging. Gambier can be used on green pelt without drawing the grain. Other materials only become mellow on standing or

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aging. The causes for this are: (1) The spending process. Astringent liquors are so because they contain tannic acids. Strong liquors are given to the most completely tanned leathers which absorb the most astringent tannins. These liquors are then used for tanning leathers not so far advanced in the process, etc. By the time they are used on the raw pelt they have become mellow. (2) Acidity is developed during the aging of tan liquors. Acids tend to swell hides. The amt. of acid present, then, plays an important part in the mellowness of liquors. Some acids have greater swelling power than others, depending more or less on degree of ionization. AcOH possesses weak swelling powers. (3) The effect of neutral salts. This is intimately connected with the effect of acids since salts decrease the ionization of their acids. $Ca(OAc)_2$ and Ca lactate are formed by the interaction of the lime carried by the hides and the acids developed in the tan liquors. J. S. ROGERS.

Methods for Deliming. "MASC." *Shoe Leather Rep.*, **102**, 12; **103**, 5, 65; **103**, 7, 25.—M. gives the main principles of the deliming process. Under methods for sole leather butts are discussed: (1) General methods, (2) uses of boracic acid, (3) lactic acid, and (4) formic acid. The article also gives methods for, (1) offal (the shoulders and bellies), (2) strap butts for belting, (3) dressing hides for upper leather, bag work, etc., (4) harness backs. J. S. ROGERS.

Exudations from Leather. "FOREMAN CURRIER." *Hide and Leather*, **42**, 17–33.—"Spueing" can practically be attributed to ferments, molds, and bacteria, all of which may be prevented or remedied. Cleanliness is effective. Antiseptics and disinfectants can be used as preventives. "Blistering" may be prevented by using tanning materials with little fermentative tendencies. If hides are received in a partially decomposed state they should be put at once into a "soak" of clean water with a little carbolic acid to prevent further decomp. which might cause "pin holes," "weak grain," etc., or an absorption of an excess of greasy matters which would cause gummy or resinous matters to exude toward the surface of the leather. Oxidation of oil is caused by exposing to moist heat without sufficient current of air. Salts containing an Fe liquor, used in blacking, are susceptible to ready oxidation and these may come in contact with uncombined fatty matters and ppt. an insol. compd. on the leather. Adulteration of oil is a principal cause, although inoculation in the "soaks" with bacteria may cause leather to "spue" after currying. J. S. ROGERS.

Water. Use in Sole Leather Tannery. CHAS. M. PROCTOR. *Shoe and Leather Reporter*, **103**, 12–34.—Good water is important in the making of sole leather and a satisfactory source should det. the location of a tannery. Water heavily infested with bacteria is not fit for use and cannot be made so by the use of antiseptics. Minerals in any quantity are objectionable, Fe especially. For soaking and washing the hides the water must be as free as possible from impurities and, if soft, will do the work more quickly. In the lime soln. any water may be used, but in subsequent washings hard water will cause $CaCO_3$ to be formed in the hide fiber which will cause irredeemable spots after it is tanned. In the acid soln., soft, pure water helps the swelling, while the presence of chlorides or other salts retards or entirely stops the plumping of the hide. For leaching and extracting the softer the water the better, because hard water darkens the color of the leather and causes a loss sometimes of 3%–5% in the tan liquors. If lime salts are present in large amts., the lime and the tannin form a ppt. in the ground bark during the leaching and prevent a complete extraction of the tanning matter. It pays to soften the water and save the tannin. Since 55–65% of an av. 25% tannin ext. is water, the sole leather tanner should purchase exts. made with suitable water. Hard water has less solvent power with the more difficultly sol. tannins. For bleaching solns., washing of tanned stock and tempering the dry leather before rolling a good,

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clean soft water should be used. Every tannery should have a lab. and chemist. Water should be analyzed frequently. Waste tannin from a tannery does not pollute a stream. On the contrary, it may serve to destroy sewerage organisms and overcome typhoid bacilli. This, however, is not true of other tannery waste. J. S. ROGERS.

Insects Destructive to Books. W. R. REINICK. *Am. J. Pharm.*, 83, 503–15.—Binding material treated with strychnine, quinine and $HgCl_2$ was not proof against destruction by insects. H. C. FULLER.

U. S., 1,004,537, Sept. 26. W. W. CROOKER, Everett, Mass. **Repairing cracks in patent leather** by removing the cracked portion of the enamel then removing the raw edges of the grained surface at the sides of the crack by applying a moving yielding surface carrying an abrasive filler, *e. g.*, a rotating wheel covered with cloth satd. with an abrasive paste, so that the crack is filled flush with the grain surface of the leather.

U. S., 1,005,554, Oct. 10. P. KESTNER, Lille, France. **Producing dry extracts**, *e. g.*, of logwood or quebracho, by preliminarily evapg. the exts. to a thick consistency, causing the ext. to traverse an evaporator heated to above 100° in rapidly moving films until the conc. is carried to such an extent that if cooled the ext. would become solid, and then discharging the hot extract in a fluid state into a vacuum to obtain a dry, porous product.

U. S., 1,006,539, Oct. 24. G. EBERLE, Stuttgart, Ger. **Unliming hides** by subjection to a bath containing a mixt. of bile, ext. of intestinal mucus and ext. of the pancreatic gland.

U. S., 1,006,977, Oct. 24. J. PAESSLER, Freiberg and H. ARNOLDI, Weinheim, Ger. **Decolorizing tannin-containing extracts** by adding Al-amalgam, stirring the mixt., heating, and allowing to cool and settle.

U. S., 1,009,616, Nov. 21. C. M. ZIMMERMAN, Cincinnati, Ohio. **Melting glue** by adding sufficient H_2O to convert the glue into a jelly and then m. the jelly by the direct action of steam.

Ger., 229,423, Dec. 8, 1908. H. SCHÄFER, Dresden. Production of a **leather preservative** in solid form. Wax, stearin and bitumen, singly or mixed, are melted in a water bath. Glycerol is mixed with com. potash or soda lye of about 40° Bé. or NH_4OH or conc. borax, soda, or potash soln., heated to 50°, and is then slowly added to the wax, with continuous stirring, until saponification has taken place. Oils and fats may also be added with a view to preserving the leather still better. The compd. can be dyed in any shade. The hot mass is cast in molds, is rigid when cold, and is dild. with H_2O for use.

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30. PATENTS.

Abstracts of patents are included under the foregoing divisions of the Journal. The abstracts of U. S. patents are prepared by Earl T. Ragan, those of the British, French and German patents by O. D. Swett and those of Canadian patents by Russell S. Smart, of Fetherstonhaugh & Co., Ottawa (5 Elgin St.). The abstracts of French patents are prepared, with permission, from the abstracts in *Chemiker-Zeitung*, those of German patents from *Chemiker-Zeitung* and *Chemisches Zentralblatt.*

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CHEMICAL ABSTRACTS

Vol. 6. FEBRUARY 10, 1912. No. 3

1. APPARATUS.

L. C. JONES.

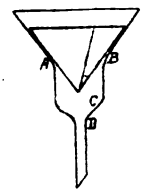
Extraction Apparatus for High Temperatures. B. ZHURAVLEV. *J. Russ. Phys. Chem. Soc.*, 43, 1189–90.—It consists of a jacketed Soxhlet permitting steam of any suitable temp. to circulate around the extraction tube and having an arrangement for carrying off the condensed steam sideways. H. M. GORDIN.

Modified Explosion Eudiometer. P. H. CAMPBELL. *Chem. News*, 104, 235–6.—The eudiometer can be completely filled with Hg. The Hg drives the air out in front of it and can be exactly controlled and the residual gas can be collected and tested. Each expt. can be carried out in 5–6 min. and a series of expts. can be carried out during a lecture to demonstrate the validity of Gay-Lussac's Law. Illustrated. C. A. COLE.

Sample-reducing Machine. E. W. MILLER. *Eng. News*, 66, 626.—The machine consists of a cylinder of galv. sheet Fe hung on a horizontal shaft passing through its axis by means of which it may be revolved. The cylinder is left open on 1 side for its full length and for 60° of its circumference, a sliding door concentric with the cylinder being provided to close this opening. A series of sectional spouts open to the exterior of the drum for 60° of this arc and entirely on 1 edge in the interior of the cylinder. Spouts are $^3/_4$ in. in width and spaced $^3/_4$ in. apart forming an angle of 90° at center of cylinder. Illustrated. C. A. COLE.

Special Machine for Quickly and Accurately Computing the Percentage of Materials Comprizing a Mixture. ANON. *Chem. News*, 104, 227.—The machine is of the ordinary platform type and mixts. can be made up, in any desired %, by simply balancing the steelyard. The max. capacity is 3 cwt. Illustrated. C. A. COLE.

New Funnel. P. BLACKMAN. *Chem. News*, 104, 211.—Filtering is greatly accelerated since nearly all the parts containing the liquid or ppt. is suspended and has no contact with the funnel. Efficiency of these funnels, compared with standard, is 2–3 times as great. *A*, *B*, *C* & *D* are rounded to give strength. C. A. COLE.



Funnel Support. P. BLACKMAN. *Chem. News*, 104, 211.—The support consists of a circular disc (4–12 ins.) with a number of concentric circular flutes or ribs, having at the center an upright tube (1 in. in length and not less than $^3/_4$ in. in the narrowest part) each end of which is funnel-shaped so that funnel may rest in it without shaking. C. A. COLE.

Movable Gas Distributer. P. BLACKMAN. *Chem. News*, 104, 247.—The gas distributer has 3 brass taps and a brass nozzle. The nozzle can be connected by means of a rubber tube with any gas jet and the taps with 3 burners, one or more of which may be used at one time. Illustrated. C. A. COLE.

The Luxometer. ANON. *J. Gas Lighting*, 116, 25.—Illumination measurements can be made at any angle irrespective of the color of the light, and c. p. measurements can also be readily made irrespective of color. C. A. COLE.

The Leskale Recording Gas Calorimeter. ANON. *J. Gas Lighting*, 116, 175–6.—

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There are no liquids used and the calorimeter reproduces the conditions under wh gas is burnt more closely than any similar instrument. The app. is guaranteed an accuracy of 1%. C. A. Co

Polarization Prisms of Glass. H. SCHULZ. Berlin. *Z. Instrument*, 31, 180–3 The supply of perfect calcite crystals is limited; $NaNO_3$ has been recommended its application is limited; tourmaline because of its strong dichroism has a limi range. A construction of glass is described which for many purposes can displ the more costly prisms quite satisfactorily. E. J. WITZEMANN.

Mixing of Liquids for Distilleries, Acid and Superphosphate Works. B. LECL *Chimiste*, 2, 323–4.—Description of an app. of Szamek having for its object the hom geneous diln. of viscous liquids with water or the mixt. of liquids of different ds. T app. is based on the principle of the T-tube aspirator. The force of the current the more mobil liquid through the main pipe of the T draws with it the heavier liqu The jet of mixed liquids falls on whirling plates and is horizontally projected in she against the sides of the container. Perfect homogeneity is obtained.

J. S. GOLDBAUM.

U. S., 1,010, 266, Nov. 28. C. F. JENKINS, Washington, D. C. **Acetylene gene ting and storing apparatus.**

U. S., 1,010,777, Dec. 5. R. M. LEGGETT, Ann Arbor, Mich. **Ozonizer.**

U. S., 1,010,991, Dec. 5. (Dedicated to the public.) H L. WALTER and C. GOODRICH, Washington, D. C. **Fat-extraction apparatus** comprizing a "Knoc flask with a hole above the normal Hg level, an extraction tube, a disk to be plac in the tube for supporting the material to be extd., a disk to prevent rizing, floati or puffing up of the material, and a spring to hold the latter in place.

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2. GENERAL AND PHYSICAL CHEMISTRY.

JOHN JOHNSTON.

Atomic Weight of the Dominant Elements. G. D. HINRICHS. *Compt. ren* 153, 817–9.—The author terms dominant elements those 10 which occur by far t most frequently in at. wt. detns.; from an analysis of all the data he concludes th their true at. wts. are whole numbers. J. J.

Electricity. I. GEORGE GEHLHOFF. *Fortschritte Chem.*, 4, 309–18; cf. *C. A* 5, 1354.—Review for the period Jan.–June, 1911, dealing especially with elect. p nomena in gases. J. J.

Heat. II. (Kinetics.) A. EUCKER. *Fortschritte Chem.*, 4, 319–28.—Revie for the period Jan.–Aug. 1911, discussing mainly the theoretical papers on heat co J. J.

Chemistry of Complex Compounds. F. EPHRAIM. *Fortschritte Chem.*, 4, 341–5 cf. *C. A.*, 5, 1214.—Review for the year ending July, 1911. J. J.

The Laws of Energy and the Physical Significance of Entropy. M. M. GARVE State College, Pa. *J. Physic. Chem.*, 15, 613–38.—The author considers that t second law of thermodynamics should be separated into 2 more fundamental law the law of redistribution and the law of transformation. The first states that energy changes in an isolated system are due to inequalities in the distribution energy; and the second, that all transformations of energy from one form to anoth take place during these redistributions. The word "ergon" is used to express t state of a system in which energy transformations are possible. The d. of a gas i

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sidered to be "more fundamental" than its pressure; use of this is made in ing the entropy change when a gas expands into a vacuum, and when one gas dif- es into another. D. A. MacInnes.

Dynamics of an Ideal Gas from the Standpoint of the Principle of Relativity and f the Kinetic Theory of Gases. W. H. Westphal. Physik. Inst. Univ. Berlin. *Ber. physik. Ges.*, 1911, 590–600, 974–7. J. J.

Theory of the Conductivity of Heat in Dilute Gases and of the Pressure Differences veloped. M. von Smoluchowski. *Ann. Physik*, 35, 983–1004.—A restatement f the author's views, with a criticism of some of the hypotheses and equations em- loyed by Knudsen in his papers on this subject. J. Johnston.

The Carbon Dioxide Content of the Atmosphere at Montevideo. J. Schröder. *Chem. Ztg.*, 35, 1211.—Analyses show that the amt. of CO_2 in the air at this place aries between 2.70 and 3.30 pts. in 10,000 by vol., being lowest during the months hen the prevailing wind is from the sea. D. A. MacInnes.

The Expansion Pressure of a Normal Fluid. L. Gay. *Compt. rend.*, 153, 722–4. —A mathematical discussion of some properties of non-associated liquids. D. A. MacInnes.

The Decomposition of Nitric Oxide in the Silent Discharge. J. Zenneck. Danzig-Langfuhr. *Ber. physik. Ges.*, 1911, 953–4; *Physik. Z.*, 12, 972.—A striking illustration of the decomp. of a gas in several stages is seen when a steady stream of N_2O_4 (or NO_2) is allowed to flow through a long narrow discharge-tube. The NO_2 is decomp. by the elec. current and 4 different colors are observed in the tube. The colors in order are: (1) yellow, (2) blue-violet, (3) green-yellow, and (4) bright red. The comp. of the gas corresponding to these colors are (4) N and O, (3) NO and O, (1) NO_2, and (2) an unstable intermediate form between (1) and (3)—perhaps N_2O_3. L. H. Adams.

Photochemical and Thermal Interaction of Chlorine and Carbon Monoxide. D. L. Chapman and F. H. Gee. Oxford Univ. *J. Chem. Soc.*, 99, 1726–39; *Proc.*, 27, 232–4.—The progress of the reaction $CO + Cl_2 = COCl_2$ was followed under various conditions of illumination by measuring the contraction accompanying it. The pres- ence of small quantities of NO, O_2, NCl_3 or O_2 in the gaseous mixture was found to have a marked inhibiting effect on the reaction. At 350° the rate of combination is greater than at room temp., but the rate is little influenced by illumination. On cooling, the mixt. rapidly recovers its sensitiveness to light. Efforts to find the temp. coeff. of sensitiveness to light were unsuccessful, due probably to an unknown inhibit- ing agent. The addition of NO to the reaction mixt. at higher temps. does not de- crease the speed of reaction in the dark, but inhibits the increase due to illumination. The speed of reaction is but slightly increased by a large increase of the exposed glass surface, indicating that the reaction is homogeneous. D. A. MacInnes.

Latent Heats of Vaporization of Mixed Liquids. I. D. Tyrer. Univ. Man- chester. *J. Chem. Soc.*, 99, 1633–45; *Proc.*, 27, 215.—By heating with a measured electric current in an adiabatic calorimeter and weighing the amt. of liquid evaporated, the latent heats of vaporization of mixtures of C_6H_6 and C_6H_{14}, CCl_4 and $(Et)_2O$, and of $CHCl_3$ and C_6H_6 were detd. through the whole range of concs. For the first and third mixtures Trouton's law, LM/T = const., (L = heat of vaporization of 1 g. liquid, M = mol. wt. and T = abs. temp.) was found to hold closely for all concs. when the mean mol. wt. was substituted for M. The failure of the 2nd mixture to follow this rule is attributed to the larger difference in comp. between the liquid and vapor phases. D. A. MacInnes.

Partial Vapor Pressures of Water and Alcohols in Aqueous-alcoholic Mixtures. V. A. Doroshevskii. *J. Russ. Phys. Chem. Soc.*, 43, 962–73.—From an exam. of

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the experimental data of his own as also of many other investigations the author deduces following 3 theorems: 1. In any aq.-alcoholic mixture the ratio of the partial vapor pressures of the H_2O at 2 different temps. is the same as the ratio of the vap. pressures of pure H_2O at these temps. Hence if we know the vap. pressures of pure H_2O at t_1 and t_2, and also the partial vap. pressure of the H_2O at t_1 in an aq.-alc. mixture, we can find its partial vap. pressure at t_2 in that mixture. 2. Exactly the same relation exists between the ratio of the partial vap. pressures of an alc. in an aq. alc. mixture at different temps. and the ratio of the vap. pressures of the pure alc. at the same temps., *i. e.*, the ratios are again equal. 3. The difference in the comp. of the vapor given off by an aq. alc. mixture at different temps. is a direct consequence of theorems 1 and 2, since it is evident that in the vap. of the mixture that component will tend to increase with the temp. whose ratio of partial vap. pressures rizes the faster with the temp. Thus, the vapors in equil. with an aq. soln. of EtOH of MeOH become richer in H_2O as the temp. rizes, while with an aq. soln. of PrOH the amt. of the latter in the vap. increases with the temp. H. M. GORDIN.

What Separates when Solutions of Metallic Chlorides Freeze? A. SPERANSKII AND A. PAVLINOVA. Kiev. *J. Russ. Phys. Chem. Soc.*, **43**, 1006–22.—Van Bijlert's method (cf. Ballo, *C. A.*, **4**, 2102) was applied to aq. solns. of NaCl, KCl, $MgCl_2$, $CaCl_2$ and NH_4Cl, using as second solute either NaOH or HCl. As a rule, in comparatively conc. solns. (about 2% Cl) the solvent alone freezes, while in dil. solns. the salts sep. together with the ice. $MgCl_2$ appears in the ice even in strong solns. After an exam. of several possible explanations, preference is given to absorption, which generally is greater in dil. than in conc. solns. H. M. GORDIN.

Theory of Solutions. ALBERT COLSON. *Compt. rend.*, **153**, 719–21, 812–4.—Remarks on osmotic pressure, as it is understood by the author (cf. *C. A.*, **5**, 3187). J. J.

Osmometry of Salt Solutions and the Arrhenius Theory of Ions. EUGÈNE FOUARD. *Compt. rend.*, **153**, 769–72; *J. physique*, [5] **1**, 627–43.—The author has calc. the mol. wts. from osmometric measurements on a number of common salts, with results which in most cases are greater than the chem. mol. wt., and thus are in absolute opposition to the ionic theory. J. JOHNSTON.

Osmotic Pressure. MAURICE PRUD'HOMME. *Bull. soc. chim.*, [4] **9**, 857–62.—A short theoretical discussion. J. JOHNSTON.

Calculation of Equilibrium Constants from Cryoscopic Measurements. J. B. GOEBEL. *Z. physik. Chem.*, **78**, 244–54.—Using the f. p. lowering as a measure of the total no. of mols. in a soln. and the usual ionization constant as a relation between the ions and the undissociated portion of the solute, the author derives a relation giving the mass law consts. for the association of the solute into double and triple mols. This is used to calc. the association, in solns. of acetic, tartaric and oxalic acids. It is also shown that the ionization relations of Na_2SO_4 can be explained if it is assumed that the salt is slightly polymerized and that the two stages of the ionization follow the mass law. No new experimental work is given. D. A. MACINNES.

The Dissociation Constant, K_2, of Sulfuric and Oxalic Acids. J. E. ENKLAAR. Utrecht. *Chem. Weekblad*, **8**, 824–9; cf. *C. A.*, **5**, 3530.—Potential measurements with H electrodes in a soln. of $NaHSO_4$ lead to a value of $K_2 = 0.018$, is good agreement with the mean value (0.017) obtained by other methods. Similar measurements, indicate that K_2 for oxalic acid is of the same order of magnitude as K for AcOH (1.8×10^{-5}). J. JOHNSTON.

New Investigations on Passivity of Metals. ERNST GRAVE. Physik. Inst., Münster

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W. *Z. physik. Chem.*, 77, 513–76.—The phenomena of passivity of Fe and Ni are studied from the reaction velocity standpoint of LeBlanc. Electrolytic Fe and Ni behave exactly like the technical metals; therefore the impurities in the technical metals are of no significance. The hypothesis that the active condition is the normal condition and that passivity is simply a great decrease in the velocity of ionization due to a negative catalyser is rejected for the following reasons: The only substance which can be produced by anodic polarization in all electrolytes are H_2O_2, O_3, O_2, and nascent O. Direct expt. shows that H_2O_2, or O_3, or both together, cannot produce the passive state although they do help to preserve the passive state. A study of the behavior of Cu_2O, MnO_2, PbO_2 and Pt electrodes covered with O_2 by anodic polarization shows that the behavior is quite different from that of passive Fe and Ni electrodes covered with O_2. G. then tests the assumption that the normal condition of pure Fe or Ni is the passive condition, and that the active state is produced by catalytic agents. Since the active state is produced by many reducing agents but destroyed by oxidizing agents, and since Fe and Ni are known to contain H_2, H is considered to be the most probable catalytic agent. This is supported by expt. which shows that ignition of Fe or Ni in air, N or vacuum to remove H makes them more passive, whereas heating in H makes them more active. H_2 at ordinary temp. does not produce the active state, but if the gas is ionized by elec. discharges it is able to produce the active state. Active Fe or Ni when heated electrically in N give up a positive charge and at the same time becomes passive. Since it is known that H can diffuse through Fe, H_2 was produced on one side of a sheet of passive Fe by cathodic polarization; after some time the Fe became active on the other side. G. concludes that pure Fe and Ni are passive, but that in the presence of H ions, which act as a catalytic agent in increasing the velocity of ionization, they become active. It is argued that many other well known facts are consistent with this view.

GRINNELL JONES.

A Case of Electrolytic Saturation Current. GEORGE JAFFÉ. Leipzig. *Ann. Physik*, 36, 25–48; cf. *C. A.*, 2, 3194; 3,1489; 4, 1842.—The current which passes through a soln. of Pb oleate in hexane or petroleum ether is for sufficiently high potential gradients very nearly independent of the potential gradients; for example, in a soln. containing 3.63×10^{-6} g. per cc. a potential gradient of 500 v./cm. produced a current of 173×10^{-12} amp. while 2000 v./cm. increased the current only to 194×10^{-12} amp. This failure of Ohm's law is explained by the hypothesis that the ions present are removed so rapidly by the strong electric field that the cond. depends not on the conc. and velocity of motion of the ions but on the speed of formation of new ions from the dissociated Pb oleate. The method therefore makes it possible to measure velocity of ionization. By the help of Langevin's relation (*C. A.*, 2, 2641), which the author confirms, he is able also to measure the speed of recombination of the ions. He concludes that both dissociation and association are in this case second-order reactions and hence the degree of dissociation is independent of conc. The temp. coeff. of speed of ionization is negative from 0° to room temp. and becomes positive at higher temp.

GRINNELL JONES.

Equilibrium in the System: Silver Iodide, Potassium Iodide and Water. W. VAN DAM AND A. D. DONK. *Chem. Weekblad*, 8, 846–55.—Series of solubility detns. were made at 50°, 30° and 0°, with results which are presented in tables and triangular diagrams. At 50° the double salt AgIKI crystallizes in fine white needles, but no indications of the formation of AgI_2KI were observed. At 30° there was no sign of the former; the latter, however, appears as a stable compd. There is a transformation point about 36.8°. At 0° the double salt AgIKI presumably again appears as solid phase. The results of Hellwig (*Z. anorg. Chem.*, 25, 180 (1900)) are discussed in the

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light of the authors' work, from which it appears that none of his mixtures could have been in equil. with one of the double salts between KI and AgI. J. JOHNSTON.

Ionization in Non-aqueous Solvents. I. H. M. DAWSON AND M. S. LESLIE. Leeds. *J. Chem. Soc.*, 99, 1601–9; *Proc.*, 27, 208.—The evidence in favor of the formation of polyiodides of the types MI_3, MI_5, etc., has been discussed in a previous paper (*C. A.*, 2, 3063). Further evidence is given by expts. on the distribution of KI and I_2 between the solvents EtOAc and H_2O, which indicate the presence of the compounds KI_3, KI_5 and KI_7 in the EtOAc phase. Cond. measurements of some of the non-aq. solns. show a decrease of the mol. cond. as the proportion of I_2 to the simple salt increases, as would be expected from the decreasing mobility of the complex I ions formed. The cases where the opposit effect is observed are explained by assuming that the polyiodides are more dissociated than the simple salt. The experimental work includes measurements of the cond. of mixtures of KI and I_2 in varying proportions in MeOH, EtOH, MeAc, EtAc, $PhNO_2$ and AcOH as solvents; also mixtures of $(Me)_4NI$ and I in the solvents benzonitrile and nitromethane, and mixtures of $(C_3H_7)_4NI$ and I in MeOH. D. A. MACINNES.

Cryoscopy in Fused Sodium Thiosulfate. A. BOUTARIC. *Compt. rend.*, 153, 876–7.—The m. p. of pure $Na_2S_2O_3$ is found to be 48.5°; the equil. point of the invariant system, $Na_2S_2O_3.5H_2O$– $Na_2S_2O_3.2H_2O$– soln.–vapor, is 48.2°. The cryoscopic constant of $Na_2S_2O_3.5H_2O$ is found to be 44°. Solns. of KNO_3, NH_4NO_3, KCl and K_2SO_4 give f. p. lowerings corresponding to almost complete ionization, while NaCl gives the normal lowering; "thus the fused $Na_2S_2O_3.5H_2O$ behaves as a conc. aq. soln. in which the water retains its dissociating power for ions not already present in the soln." D. A. MACINNES.

Indifferent Points. M. JOUGUET. *Compt. rend.*, 153, 346–9.—A theoretical discussion. GEORGE W. MOREY.

Electrical Conductivity of Potassium Bromide and Potassium Silver Cyanide in Mixtures of Glycerol with Alcohols. L. PISARZHEVSKII AND A. SHAPOVALENKO. Polytechn., Kiev. *J. Russ. Phys. Chem. Soc.*, 42, 905–38.—In order to det. the relation between the equil. const. of one and the same reaction in different solvents and the changes in the degrees of dissociation of the reacting substances, the authors prepd. pure KBr, $KAg(CN)_2$, EtOH and glycerol by the method previously given (*C. A.*, 5, 611) (the MeOH of Kahlbaum was pure), and detd. the elec. cond. of the solns. of the 2 salts in H_2O, EtOH, MeOH and mixtures of 25%, 50% and 75% of glycerol in the 2 alcs. The results are as follows: The difference in the cond. of aq. solns. of $KAg(CN)_2$ at dilns. of 32 and 1024 l. is about 10; hence according to formula, $n = \Delta/10$ (n is the basicity of the acid and Δ the difference in cond.), $KAg(CN)_2$ must be regarded as a salt of $HAg(CN)_2$. In EtOH the conds. of both salts at 25° is about 50% of what it is in MeOH (1 : 2.08 at zero conc.). In pure glycerol the cond. of both salts is very slight. The addition of glycerol to either alc. greatly reduces the cond. of both salts, both at 25° and 45°. With the exception of solns. consisting of 75% and 50% of glycerol in MeOH, the 2 salts have the same cond. in all mixed solvents at 25°. At 45° their conds. are not identical. Comparing the values of the conds. at zero concs. (Λ_0) with the corresponding values of the viscosity (η_0) obtained in the previous investigation (*l. c. cit.*), it is found that the product $\Lambda_0\eta_0$ is const. at different temps., provided the solvents are pure, have similar chem. properties and belong to the same homologous series. This does not hold in mixtures of glycerol with alcs. (MeOH or EtOH). Hence Walden's rule of the constancy of this product for Et_4NI at different temps. and in different solvents has no general validity. The relation between the degree of dissociation of $KAg(CN)_2$ and that of KBr is const. for mixtures of glycerol with either MeOH or EtOH, as also for mixtures of the alcs.

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th H_2O. The variation of the equil const. of the reaction: $2AgCN + KBr \rightleftharpoons$ gBr + $KAg(CN)_2$, as we pass from one solvent to another, is not due to changes the degrees of dissociation of the reacting substances. H. M. GORDIN.

Colloidal Sulfur. III. M. RAFFO AND J. MANCINI. Bologna. *Z. Chem. Ind. olloide*, 9, 58-61; cf. *C. A.*, 3, 519.—A soln. of the following comp. is stable: S olloidal) 2.79–2.60%, H_2SO_4 6.43–7.00%, Na_2SO_4 3.75–3.92%. An increase or de-ase in the electrolyte conc. causes pptn. of the S. The addition of other salts to is soln. causes partial pptn. of the S, K ions having much the greater effect for a ess conc. The effect of Na, Mg, Zn, and Al salts varies widely with the nature of e negative ion, but in no case is it as great as for the same conc. of a K salt.

H. ISHAM.

The Aggregation and Crystallization of Water in Connection with the Question its Physical Condition. I. SKVORZOV. Kiev. *Z. Chem. Ind. Kolloide*, 9, 107–12. A discussion of the structure of water in its different phases. The difference be-ween liquid and solid water is analogous to the difference between a colloid and a ystalloid. H. ISHAM.

The Formation of Layers in Heterogeneous Systems. E. HATSCHEK. London. *Chem. Ind. Kolloide*, 9, 97–100.—A theoretical discussion showing the tendency f 2 kinds of particles of different rates of diffusion to form layers when settling through ater. H. ISHAM.

Investigation of the System: Gum-arabic—Gelatin. F. W. TIEBACKX. Amster-am. *Z. Chem. Ind. Kolloide*, 9, 61–5.—Acids acting on a gum-arabic—gelatin mix-re cause first cloudiness, then coagulation, then solution (peptization) as the conc. increased, in the order 0.01 *N* HBr > 0.01 *N* HCl > 0.01 *N* H_2SO_4 > 0.1 *N* HOAc. e the temp. of the mixture is raised the range of acid conc. giving a coagulum be-mes less. By placing fixed amts. of the gelatin-gum mixture in test tubes and after atinization adding acid solns., the appearance of a ring of coagulum in the gel, hich as it proceedes downward through the tube is followed by the clearing due to ptization, shows that with equal gelatin conc. the greater gum conc. gives the wider ng of coagulum. If salts are added to the gelatin-gum mixture the coagulating fect of the acid is decreased. The coagulum formed by an acid can be dissolved y a salt, the anions being effective in the following order: $C_2H_3O_2 > SO_4 > Cl > Br > SCN$; e cations K > Na > Zn for given acid coagulum. This is analogous to the effect acids and salts in enzyme action, a slight conc. being advantageous, a greater conc. armful. Enzymes may be a complex like gum-gelatin which under the influence a certain H ion conc. form an absorption comp., the formation of which is inhibited y greater conc. of acid. The effect of the H ion may be either to increase or de-rease the activity, as Bredig and von Berneck have shown that acids decrease the talytic effect of AgCl on H_2O_2, while alkalies restore it. The heat coagulation of oteins is also analogous, where there is an optimum acid conc. for coagulation and alts interfere with coagulation. H. ISHAM.

Diffusion Phenomenon in Electrolytes. (Separation of Acid from the Base in Salts.) L. VANZETTI. Milan. *Z. Chem. Ind. Kolloide*, 9, 54–8.—The simple diffusion of a alt soln. in water, without use of a diaphragm or gelatin, gives a noticeable sepn. of the acid from the base. The more rapid diffusion of the acid was shown by placing an indicator in the water into which diffusion was taking place. A phenolph. soln. made just red with alkali, became colorless on standing over $FeCl_3$ soln. This is most quickly and unmistakably shown for easily hydrolyzed salts, but was likewise recog-nized for $CuSO_4$ and KCl, but not for NaCl. $ZnCl_2$ in diffusing upward through a tube of water deposits rings of an oxychloride, insol. in water; if x is the distance of each ring from the separating surface between the soln. and the water, and t the time

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(measured from the commencement of the expt.) at which the ring appears, then $x/t = K$, in agreement with Stefan's law of diffusion. H. ISHAM.

The Structure of Ultramicroscopic Particles. T. SVEDBERG AND K. INOUYE. Upsala *Z. Chem. Ind. Kolloide*, 9, 49–53.—Previous work shows that the Einstein formula (*C. A.*, 5, 21, 3534) holds for very small ultramicroscopic particles, but not for larger particles; this is accounted for on the assumption that the larger particles are not spherical, and therefore present a greater frictional surface than the formula allows. The study of the Brownian movement of sols prepared by different methods was undertaken in the hope that it would throw some light on the form and structure of the particles. The following conclusions are reached: The average distance covered by a particle along the x axis (λ_x) calc. by the Einstein formula agrees with the value observed with sols of high degree of dispersion, prepared directly by reduction. Sols of high dispersion prepared by seeding or aggregation (by acid) show about equal variation of λ_x from the theoretical. For lower dispersion the variation of λ_x from the theoretical is about the same for all 3 methods of prep., and is greater than for higher dispersion. This increased frictional resistance is due to the nature of the particle as an aggregate, and to its variation from the spherical form. Those sols which show divergence from the Einstein formula also show anomalous polarization of light (Siedentopf, *Physik. Z.*, 6, 855 (1905)) which indicates non-spherical particles. H. ISHAM.

The Importance of Degree of Dispersion in Investigations of the General Characteristics of Sulfur Sols. S. ODÉN. Upsala. *Z. Chem. Ind. Kolloide*, 9, 100–6; cf. *C. A.*, 5, 2460.—S sols of different degrees of dispersion were obtained by fractional coagulation and separation of the coagulum from the sol by centrifuging. T. Svedberg (*C. A.*, 5, 1612) has shown that for particles of uniform size $c = e^{k(t-t_0)}$ where c = % S present, t is the temp., t_0 and K are constants. By detg. the amt. of S dissolved by solns. of NaCl from a coagulum of S obtained by coagulation with NaCl, the equation was tested on S sols in which the particles were of nearly uniform diameter, about 265$\mu\mu$; the solubility of S was found for temps. 10°–17.5° to agree with the equation $c = e^{1.038(t-14.5)}$. It is shown that coagulation and re-solution of colloidal S by NaCl soln. does not cause any change in the size of the colloidal S particles. With unvarying NaCl conc. the values for t_0 and k vary inversely with the degree of dispersion. With increasing degree of dispersion t_0 decreases faster than k. With degree of dispersion constant t_0 varies directly with the conc. of NaCl, while k remains almost const. Addition of small amounts of acids decreases t_0, leaves k unchanged. This exponential equation does not hold for sols containing particles of widely different diameters; the applicability of the equation is a test for the uniformity of the size of the particles. If two sols each uniform, but of different size particles, are mixed, the solubility of the one size particle is not affected by the small amt. of the other size in soln. On the basis of this fact, the deduction is made that a sol which contains equal quantities of all possible sizes of S particles between certain limits would give a straight line; in other words its conc. would be a linear function of the temp. For sols of uniform size particles in NaCl soln. the change from sol to coagulum is accompanied by the absorption of a certain amt. of NaCl. If α is the conc. of NaCl in the sol, then by raising the temp. and dissolving the coagulum, α is found to be a linear function of the S conc. The amts. of NaCl and of S in the soln. were detd. and showed good agreement with the calculated values. The constants vary directly with the degree of dispersion of the colloid. Thus the coagulation of a sol of particles of varying size should show less absorption of the salt toward the beginning of the reaction than at the end when the more dispersed phase is coagulated. H. ISHAM.

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Absorption of Light by Inorganic Salts. I. Aqueous Solution of Cobalt Salts in the Infra-red. R. A. HOUSTOUN. Physic Lab. Univ. Glasgow. *Proc. Roy. Soc. Edinburgh*, 31, 521–9.—Detn. of the mol. extinction coeff. {A in the equation $I = I_0 10^{-A c d}$ (I and I_0 original and final intensities, c the molar conc. and d the length in cms. of path traversed)} were made, using a thermopile and ironclad galvanometer, for wave-lengths between about 0.6 and 1.3μ. The salts investigated were the halides, nitrate and sulfate. The effect of heating or of increased conc. is to increase the absorption at both ends of the region investigated. **II. Aqueous Solutions of Cobalt Salts in the Visible Spectrum.** R. A. HOUSTOUN AND ALEX. R. BROWN. *Ibid.*, 530–7.—The same salts were investigated for $\lambda\lambda$ 424–717 $\mu\mu$, using a new type of spectrophotometer (*Phil. Mag.*, 15, 282 (1908)). **(III). Aqueous Solutions of Nickel Salts in the Visible Spectrum and the Infra-red.** R. A. HOUSTOUN. *Ibid.*, 538–46.—The results of similar measurements for the corresponding Ni salts are presented in tables and curves. **(IV). Aqueous Solutions of Cobalt and Nickel Salts in the Ultra-violet.** *Ibid.*, 547–58.—The relative intensities were detd. photographically using a quartz spectrograph and the inverse square law. A is, to a first approximation, apparently an additive property for the salts examined. In each Co salt there is a band at 0.51 μ and another in the infra red. With the Ni salts there are 3 maxima, at 0.405, 0.690 and 1.210μ. The bromides indicate a band at 0.285μ, another outside the range of the expts.; the iodides bands at 0.292, 0.355μ, and a third at the end of the range. J. JOHNSTON.

Th Ultra-red Absorption Spectrum of Carbon Dioxide in its Relation to Pressure and Partial Pressure. G. HERTZ. *Ber. physik. Ges.*, 1911, 617–44.—The absorption of radiant energy by liquids follows Beer's law closely, that is, the absorption is dependent only on the amt. of absorbing material. Whether or not this simple relation applies also to gases is of importance in connection with many questions. Measurements of the absorption of CO_2 in the vicinity of the absorption bands at 2.7, 4.3 and 14.7μ were made under varying conditions of partial and total pressure. The measurements around 14.7μ show that here the absorption is dependent not only on the product of the layer thickness and partial pressure but also in a high degree on the total pressure. The results at 4.3 and 2.7μ confirm the earlier investigations of Angström and E. von Bahr. The influence of the addition of H and of air was found to be different. In general, the absorption seems to be conditioned by the number of collisions per sec. of the CO_2 mols.; in the case of the absorption at 14.7μ, however, the relations are more complicated, and apparently the nature of the admixed gas is also a detg. factor. Incidentally, it was shown that the absorption band at 2.7μ consists of 2 maxima: one at 2.67μ, the other at 2.75μ, of which the former is the greater. L. H. ADAMS.

Influence of Temperature upon the Magnetic Properties of a Graded Series of Carbon Steels. MARGARET B. MOIR. Physic. Lab., Univ. Glasgow. *Proc. Roy. Soc. Edinburgh*, 31, 505–16.—Attention is directed to the importance in magnetic testing at different temps. of rendering the specimen neutral at the new temp. previous to making the test. The magnetic quality of cast iron for moderate values of the magnetizing force improves from 15–190°; falls off from 190–260°; improves again thereafter, and finally becomes non-magnetic at the critical temp. This indicates the presence of a transformation point for FeC alloys in the neighborhood of 200°. The magnetic behavior of 3 steels (containing 1.64, 0.8 and 0.3% C resp.) was also investigated, and found to be similar to that of the cast iron; the transformation point is less marked as the amt. of C decreases. The susceptibility-temp. curve of a specimen of soft Fe containing 0.06% C exhibits no turning points in the neighborhood of 200° for fields lying between 2 and 15 c. g. s. units. J. JOHNSTON.

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Alloys of Aluminium and Zinc (ROSENHAIM, ARCHBUTT). 9.

3. RADIOACTIVITY.

HERMAN SCHLUNDT.

Radioactivity of the Products of the Recent Eruption of Etna. Preliminary Communication. A. PIUTTI AND G. MAGLI. R. Univ., Napoli. *Gazz. chim. ital.*, 41, I, 717–22; cf. *C. A.*, 5, 247.—The radioactivity of some 25 specimens of material ejected by Etna in March, 1910, and collected 5 ds. to 7 wks. after the eruption, was measured. It ranged from 0 to 2.74×10^{-3} U units and increased, according to the nature of the material, in the order: sands, lavas, scorias, sublimations and incrustations; the radioactivity does not, therefore, seem to stand on any relation with the presence of Pb, as this element was not found in the incrustations. CHAS. A. ROUILLER.

The Individual and Joint Chemical Action of Alpha and Beta Rays. F. L. USHER. Univ. Col., London. *Jahrb. Radioakt. Elektronik.*, 8, 323–34.—The β-rays from 0.067 cu. mm. of Ra Em. sealed in a glass capillary of 0.17 mm. wall and surrounded by water which had been carefully freed from dissolved gases, produced 0.145 cc. of electrolytic gas ($2H_2 + O_2$), 0.042 cc. of excess H, and 0.02 cc. of CO_2. In another expt. the gases resulting from the joint action on water of the α- and β-rays from 0.025 cu. mm. of Ra Em. during its decay were found to be 4.889 cc. of electrolytic gas, 0.634 cc. of excess H 0.162 cc. CO_2, and 0.007 cc. N. The CO_2 and N are not regarded as resulting from the action of the rays on H_2O. The excess of H may be partly due to the formation of H_2O_2. Assuming that 44% of the β-rays from Ra C are stopped by the glass walls, the vol. of gas produced by the β-rays alone from the Em. in equil. with 1 g. of Ra (metal) is calc. to be 6.486 cc. The α-rays from the same quantity of Em. would produce 130.12 cc., the ratio being about 1 : 20. Assuming that 2 β- and 3 α-particles are expelled in the disintegration of Ra Em. to Ra C the relative vol. per particle is 1 : 13. Other expts., however, indicate that the quantity of gas liberated by the action of the β-rays alone is far too low on account of the absorption of the rays by the wall of the tube containing the Em. Another calculation in which this loss of β-rays is introduced gives 45.5 cc. as the vol. of the gas produced by the β-rays from the Em. in equil. with 1 g. of Ra. If this figure is assumed then the vol. of gas resulting from the action of the α-rays alone is only about twice as great. Hence it seems probable that the mechanism of the action depends primarily on the elec. charge carried by the rays. It is also calc. that an atom of Em. decomposes about 154,000 mols. of H_2O. H. SCHLUNDT.

The Radioactive Properties of High Temperature Flames. H. CARTER. Royal Coll. Sci., London. *Phil. Mag.*, 22, 805–16.—The electric arc, the oxyhydrogen and oxyacetylene blowpipe flames, and the elec. spark have been investigated. Negative results are obtained in the first 3 cases. The β-radiation given off from the spark is extremely small, if any, and is certainly not large enough to account for any appreciable fraction of the ionization product. A. T. CAMERON.

The Diffusion of Neon through Hot Quartz. O. W. RICHARDSON AND R. C. DITTO. Palmer Phys. Lab., Princeton Univ. *Phil. Mag.*, 22, 794–6.—Jacquerod and Perrot (*Compt. rend.*, 139, 789 (1904)) observed first that He diffuses through red-hot quartz tubes. Expts. to detect the presence of the heavier inert gases in minerals were carried out by heating these in silica tubes and compressing the gases produced into other heated silica tubes containing Ca. The residual gas was then forced into a spectrum tube and examd. spectroscopically. Ne having been observed with a sample of witherite; fresh silica ware was employed in a blank expt. After heating 1 hr.,

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the yellow He line was discernable; after 3 hrs. heating the He spectrum was fully developed, and the Ne line, 5852, well marked. After heating all night all the prominent Ne lines were recognizable. The temp. was about 1000°. Since there is about 10 times as much Ne as He in the atm. its coeff. of diffusion is evidently smaller. It would seem likely that A also would diffuse through hot quartz, but in that case its coeff. of diffusion must be very small, since there was no accumulation of A in these expts. A. T. CAMERON.

The Variation with Time of the Activity of some Radioactive Substances. MME. P. CURIE. Faculté Sci., Paris. *Radium*, 8, 353–4.—A series of measurements of the activity of salts of Ur, Ra, Act and Ra D, has been made for several years and is being continued. The first results are now communicated. Measurements with the black U oxide have been made yearly since Aug., 1907, showing no difference exceeding the limits of experimental error. A radiferous Ba salt was initially freed from traces of Ra D, E and F, and observations made with it for 20 months. There was a slow increase of activity amounting to 4%; it should be 2.5% per year for the first 2 yrs., and is to be attributed to the progressive formation of Ra E. The Act salt used had been prepared several yrs. previously; it was introduced into a thin glass tube and the β- and γ-rays measured for 3 yrs. The measurements showed small inexplicable irregularities but represented a total diminution of activity of about 10%. This cannot be attributed to radioactinium or Act X, since these must have been in equil. with the Act previous to the commencement of the observations. Either there exists between Act and radioactinium an intermediate product of long life, giving a penetrating radiation and present in excess in the substance examd., or Act is not a substance of long life, as has been believed to the present time, but disintegrates relatively quickly—it would have an av. life of only 30 yrs. Radioactive $PbCl_2$, initially freed from Ra E and F, has been under observation since May, 1906. The penetrating rays attained a const. value after 1 month which gives Ra E the period of 4.7 yrs. The α-rays attained a max. in 2 yrs. If the period of Ra D is greater than 15 yrs. the exponential law for the decrease of the α-rays should be established within 0.5% after 4 yrs. In 440 days the diminution of activity has been 5% of the value observed at the beginning of the 5th yr. A precise calculation is not yet possible but Ra D has a period of about 17 yrs. and an av. life of about 25 yrs. A. T. C.

The Distribution of Intervals of Emission of the Alpha Particles of Polonium. MME. P. CURIE. Faculté Sci., Paris. *Radium*, 8, 354–6.—The law of emission of particles from polonium has been studied by Rutherford's scintillation and electrometric methods, and the results agree with those of Rutherford and Geiger (*C. A.*, 5, 1231) and Marsden and Barrett (*Proc. Phys. Soc. London*, 23, 367–73 (1911)). The time intervals sepg. the emissions of particles can be measured with great precision by the second method. A series of 1080 such intervals has been measured in order to find how n, the number of intervals between times t and $t + \theta$ (where θ represents a fixed interval of convenient size) varies with t. It is found that n varies in accordance with an exponential law so that $n = n_0 e^{-t/\tau}$, where τ is the mean interval, and $n_0/\theta = N/\tau$, N being the total number of intervals. A. T. C.

Thorium and its Products of Disintegration. MAY S. LESLIE. Faculte Sci., Paris. Lab. Mme. Curie. *Radium*, 8, 356–63.—Fifty g. of thorite were carefully examd. for the presence of unknown members of the Th series. None were found. Besides Th and its disintegration products, the members of the U series are present in small quantity, but no other active elements. Mesothorium is pptd. with the insol. sulfates, but probably incompletely by a single treatment since in this case the Th obtained by washing the sulfate residues with water has after 1 yr. too great an activity. By repeatedly pptg. a Th salt with NH_3, all the mesothorium is probably held in soln.

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It is pptd. in part with the carbonates of the alk. earths, and with the oxalates in acid soln. and is carried down with $Fe(OH)_3$. The relative activities found for the different Th products in equil. accord with the theory that the emanation gives 4 α-particles. Th itself is slightly active giving rise to α-particles of range scarcely more than 2 cm. Radio Th has a period of some months only, and a range of 2 cm. A. T. C.

A Possible Relation between Uranium and Actinium. J. W. NICHOLSON. Trinity Coll., Cambridge. *Nature*, 87, 515.—It is suggested that the new product called U-Y which Antonoff (*C. A.*, 5, 3653) has recently sepd. with U-X from U, and which is supposed to be a branch product of U, may be the origin of the Act series. This would be possible if 2 atms. of U weighing 477 would break up together forming 3 atms. of one substance which would then have an at. wt. of 159. If U-Y be considered as this substance, it would thus have approx. the at. wt. expected of the product which gives rise to the Act series. W. H. Ross.

Methods of Determining the Unit Electric Charge. R. POHL. *Jahrb. Radioakt. Elektronik*, 8, 406–40.—A review. H. S.

The Presence in Point Discharge of Ions of Opposit Sign. J. ZELENY. Physic. Lab., Univ. Minn. *Physic. Rev.*, 33, 70–3.—Expts. are described which show that when a point is discharging electricity into an atm. of air or H at low pressure, there is present in the gas a considerable number of ions of opposit sign especially in the larger currents, but for pressures down to as low as 15 cm., and with currents up to 7 micro-amp., these ions are not sufficiently numerous to effect the elec. field appreciably. W. H. R.

Nature of the Large Ions in the Air. J. A. POLLOCK. Univ. Sydney. *J. Proc. Roy. Soc. N. S. W.*, 43, 198–203 (1909).—Measurements of the mobility of the large ions in the air, for various values of the humidity, by establishing the existence of a definit relation between these quantities, afford proof that the ions are composed, in part at least, of H_2O mols. These ions are formed in dusty, but not in dust-free, air. The evidence indicates that the large ions are composed of a small ion attached to a dust particle round which H_2O mols. are collected, even in unsatd. air, to an extent depending on the humidity. J. JOHNSTON.

A Verification of the Theory of Brownian Movements and a Direct Determination of the Value of *Ne* for Gaseous Ionization. H. FLETCHER. Physic. Lab., Univ. Chicago. *Physic. Rev.*, 33, 81–110.—The continual agitation of a small particle suspended in a gas, known as Brownian movements, is entirely explained by the kinetic theory of gases, both qual. and quant. The value of Ne for gaseous ionization as detd. by a method which involves only the same set of expts., and not totally different types of expts. as heretofore has been the case, is shown to be the same as that obtained from electrolysis. The irregular values of e apparently resulting from the work of Ehrenhaft and Przibram are entirely explained by the Brownian movement. W. H. Ross.

The Mass of the Gaseous Ions. W. DUANE. *Compt. rend.*, 155, 336–9.—With a view to obtaining further evidence on the existence of positive ions some expts. were made in detg. the ratio m/e for the positive ions in air and in H ionized by the α-rays from Ra Em. The results obtained under the experimental conditions described in the article are opposed to the hypothesis of the existence of these ions. W. H. R.

The Mobility of Positive Ions Produced from Heated Aluminium Phosphate in Gases at Low Pressures. G. W. TODD. Cambridge Univ. *Phil. Mag.*, 22, 791–804.—The positive electricity emitted by heated Al phosphate forms ions in the gas present identical with the ions produced by X-rays, showing that the positive particle emitted

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from the salt hands over the charge to the gas mols. on collision. The mobility of the positive ion is inversely proportional to the pressure of the gas down to a certain low critical pressure approx. inversely proportional to the d. of the gas, below which pressure the mobility increases very rapidly. This rapid increase may be due to the cluster of mols. forming the ion breaking up into less complex groups, or to the existence of a positive unit in the free state for a short time at low pressures or to both. Calculating the mass (m) of the ion from Langevin's formula, mobility $k = e\lambda/mv$ (where λ is the mean free path and v the velocity of thermal agitation of the ion) numbers were obtained indicating that the ion consists at ordinary pressures usually of about 6 mols., and for H of about 12, round the positive charge. These groups break up at low pressures giving an increased mobility. With air and CO_2 measurements at the lowest possible pressures show that the positive charge is carried by something less than the mol. of the gas. This may be due to the existence of a universal positive unit or to H contained by the Pt. A. T. CAMERON.

Volatilization of Electrode (CLAUDE). 4.

4. ELECTROCHEMISTRY.

C. G. FINK.

New Hydroelectric Development in Canada. E. GUY. *Elect. Rev. West. Elec.*, 59, 1119.—A municipal development at Winnipeg is described, which develops 26,000 h. p. Elaborate provision for the purification of transformer oil is made. Pumps, tanks, dehydrators and separators are provided. The separator is of the centrifugal type and the dehydration is accomplished with CaO. Detailed description and illustrations of the elec. equipment are given. W. E. RUDER.

Operating Statistics of the Municipal Electric Plant of Pasadena, Cal. C. W. KOINER. *Eng. News*, 66, 675. J. J. M.

The Grönwall Steel Furnace. ANON. *Elec. Rev. West. Elec.*, 59, 1139.—The furnace has 2 C electrodes passing through the roof; the basic lining of the hearth forms the 3rd electrode. Two-phase current is used, the bottom electrode serving as the common return. The electrode holders have special advantages: (1) The holder grips the electrode and makes electrical contact; (2) they are simple and strong; (3) contact is made low down, thus reducing the losses through electrode resistance. Special advantages are claimed for the 2-phase heating as the breaking of 1 arc does not interfere with the other and the passage of current through the bottom keeps this portion from solidifying. The arrangement produces a vertical as well as a horizontal circulation of metal. W. E. R.

Transformation of Other Forms of Carbon into Graphite. W. C. ARSEM. *Trans. Am. Electrochem. Soc.*, 20, 105; *Chem. Eng.*, 14, 400; *J. Ind. Chem.*, 3, 799.—Each sample of C examd. was fired for 1 min. at 3000–3300° in a graphite tube furnace with and without addition of mineral material and samples naturally containing the latter were fired also after it had been largely removed. The sp. gr. was used as the ultimate test to denote the degree of transformation under the assumption that for pure graphite it is 2.25–2.26. All the pure forms of C reached a limiting d. corresponding to a more or less complete conversion into graphite. This was not appreciably raised by the addition of mineral matter. The impure C behaved similarly, although removal of most of the ash from coal secured greater transformation into graphite. A small amt. of mineral matter exercizes no beneficial effect on the conversion. To account for the varied behavior of different samples, A. assumes that there are many varieties of

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"amorphous C," some of which are readily transformed by heat into graphite while others are not. G. R. FONDA.

Industrial Manufacture of Pure Nitrogen. GEORGES CLAUDE. *Compt. rend.*, 153, 764–6.—For the fixation of N by Ca_2C_2, no more than 0.4% of O can be present. To obtain N from liquid air, the necessary elimination of O is secured by Linde's app. and by the author's. G. R. F.

Preparation of Ammonium and Chloride Gold Baths. G. NICOLAUS. Hanau. *Elektrochem. Z.*, 18, 207.—For Au alloy deposits, the chloride bath is recommended but for regular Au deposits the NH_4 bath, although harder and more expensive to prepare, is recommended as much better. Methods of prep. for each are given. W. E. RUDER.

Electrolysis of Sodium Chloride with the Mercury Cathode. CHARLES A. PETERS. *Am. J. Sci.*, 32, 365–85.—Expts. were made with the Myers' Hg cathode cell and a rotating gauze anode of Ag or Ag-plated on Pt in 0.1 *N* NaCl solns. Ag was transferred to the cathode, although in negligible amts. After the beginning of electrolysis NaOH was always present in the inner cell. G. R. FONDA.

Notes on the Chemistry and Metallurgy of Vanadium. III. W. F. BLEECHER. *Metal. Chem. Eng.*, 9, 499–505.—The article treats with the methods of extraction from the ore, and states that this must be essentially a chem. process. B. has devised an electrolytic method for the production of a high grade oxide. The liquor from the extraction after suitable treatment is conc. to contain 200 g. per l. This is electrolyzed in a compartment cell fitted with a porous cup. The V liquor is poured into the porous compartment, and H_2O and lye into the outer compartment. "The Na ions pass through the porous cell into the cathode compartment, leaving the V ions in the anode compartment. Since Na vanadate is very sol. in water, and the vanadic acid almost insol. a pptn. occurs upon the removal of the alkali." A c. d. of 30 amps. per sq. ft. of anode at 6–8 v. is used. L. J. ROGERS.

Anodic Behavior of Nickel in the Presence of Chromous Salts. C. RUSSO. Ist. chim. gen. r. univ. Pisa. *Gazz. chim. ital.*, 41, II, 101–9; cf. *C. A.*, 5, 2371.—$CrSO_4$ hinders but does not entirely prevent the passivization of Ni and it modifies the polarization values but slightly. CHAS. A. ROUILLER.

The Nickel-Iron Storage Battery. J. A. MONTPELLIER. *Lumière elec.*, 16, 244–9; cf. *C. A.*, 3, 1962–2909.—A detailed discussion and description of the latest types of the Edison, the Gouin and the Pb storage batteries. The electrolyte of the improved Gouin automobil cell is a 22% KOH soln.; for stationary cells, a 20% soln. is used. The positive electrodes consist of perforated tubes of pure Ni filled with carefully prepared Ni hydroxide and powdered graphite. The graphite is added to ensure better conduction. Each plate consists of 33 of these tubes horizontally supported on Ni racks to which they are securely riveted; each plate weighs 400 g. and contains about 300 g. of active material. The negative plates are 4 mm. thick and are composed of braided or twisted Fe wire the surface of which is subsequently oxidized. A single plate weighs 345 g. The complete cell has 12 + and 11 — plates and weighs 13 kg. over all. Its vol. is 20 × 12.4 × 33 cu. cm. Under favorable conditions, discharging at 25 amps. and 1.24 v., the efficiency of the cell is 33 w. hrs. per kg.; when discharging at 130 amps. and 1 v. the efficiency is 22. Short circuiting the cell is permissable. The cost is 6 cents per available w. hr. The life of the stationary type approximates 1000 discharges, that of the traction type, 500. It is very much more stable mechanically than the 1910 Edison cell. A detailed comparison is given. The manufacturing costs are lower for the Gouin cell. The Gouin plates are all of the same dimension and adapted to cells of all sizes from 2 to 10,000 w. hrs. The comparative efficiencies per

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unit wt. and per unit vol. are: Gouin, 29 and 58; Edison, 24 and 52; best Pb cell, 22 and 49. C. G. FINK.

Self-adjusting Iron Resistances for Charging Storage Batteries. G. C. *Helios.*, 27, 2301–4.—When using the lighting circuit or other const. voltage supply for charging storage batteries, it is almost always necessary to use a rheostat which must be regulated throughout the charging time. The author recommends the use of Nernst balast resistances which regulate the current supply automatically. They can be screwed into ordinary lamp sockets and last indefinitly. The thin Fe wire is enclosed in a hermetically sealed glass bulb containing a small amt. of pure H. The regulation ranges between + and — 50% of the rated voltage, *e. g.*, a 1.5 amp., 30 v. balast has a regulating range between 15 and 45 v. Diagrams and details are given for various applications of these balasts. They are manufactured by the Allgemeine Elektricitäts Gesell. of Berlin. L. K. MULLER.

The Electrical Resistance of Metals and Alloys at Low Temperatures. J. CLAY. *Jahrb. Radioakt. Elektronik.*, 8, 383–406.—A summary. H. S.

Methods of Starting Mercury Vapor Lamps. O. KRUH. *Elektrotechn. u. Masch.*, 30, 615–21; *Electrician*, 68, 299–31.—Various ordinary methods of starting are discussed. K. proposes a method of ionizing the gases in the lamp by utilizing radiation effects due to heated alk. oxides deposited on a Pt spiral placed near the Hg cathode. Cooper Hewitt has proposed the use of radioactive substances but K. has failed to produce any results with U. More powerful substances, such as Ra amalgam, might cause the lamp to light with the mere application of the necessary voltage.
C. N. MOORE.

The Different Forms of Iron and Copper Arcs. AUGUST HAGENBACH. Basel. *Physik. Z.*, 12, 1015–20.—Presents the results of a study of the Fe and Cu arcs under varying conditions of e. m. f., current, pressure and comp. of surrounding gas.
L. H. A.

Volatilization of Electrode in Neon Tubes. GEORGE CLAUDE. *Compt. rend.*, 153, 713–5.—C. has already shown that diminution in the pressure of neon tubes is due to the absorption of the gas by the volatilized electrode material (*C. A.*, 5, 3011). To account for the unexpected appearance of He in this gas, he devized an X-shaped neon tube, fitted in opposit arms with 2 pairs of small Cu electrodes. Each pair was operated in succession. In the gas absorbed by the Cu volatilized from the first pair, He predominated, whereas in the gas from the Cu deposit formed by the subsequent operation of the second pair, Ne alone was found. This confirms the hypothesis that the appearance of He is due to selective absorption, for if transmutation had occurred He would be equally pronounced in the gas absorbed by each deposit.
G. R. FONDA.

Photometry of Large Light Sources (STICKNEY, ROSE). 21. Melting Ferromanganese (SCHROEDER). 9.

U. S., 1,009,731, Nov. 28 H. W. FISHER, Pittsburgh, Pa. **Making sheathed insulated cables** by driving air and moisture from a core by subjection to a vacuum, flooding it with insulating compd., drawing the core from the compd. and simultaneously with its withdrawal surrounding it, to the exclusion of air, with a sheath of Pb.

U. S., 1,010,001, Nov. 28. J. L. K. SNYDER, Cleveland, Ohio. Assignor to Natl. Carbon Co., Cleveland, Ohio. **Electric furnace of the arc type** having an adjustable conducting cover which forms one of the electrodes.

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U. S., 1,010,402, Nov. 28. J. T. H. DEMPSTER, Schenectady, N. Y. Assignor to Gen. Elec. Co. **Arc-light electrode** composed principally of a mixt. of Ti oxide and ferruginous material, *e. g.*, Fe_3O_4.

U. S., 1,010,444, Dec. 5. J. I. MITCHELL, Pittsfield, Mass. Assignor to Gen. Elec. Co. **Impregnating transformer coils with japan and hardening at a low temp.** to hold the turns in place, and then impregnating with another material, *e. g.*, copal gum, rosin and castor oil, and hardening at a higher temp.

U. S., 1,010,866, Dec. 5. W. D. COOLIDGE, Schenectady, N. Y. Assignor to Gen. Elec. Co. **Making composit filaments** by coating thoria with Cu, depositing on the Cu a layer of W and then heating sufficiently to drive out the Cu and leave a composit filament of thoria and W.

U. S., 1,010,942, Dec. 5. B. MONASCH, Berlin, Ger. Assignor to Gen. Elec. Co. **Arc-lighting electrode** of Fe having a core of Cu.

5. PHOTOGRAPHY.

LOUIS DERR.

Positives by Development after Fixing. A. AND L. LUMIÈRE AND A. SEYEWETZ. *Rev. gèn. chim.*, **14**, 313–4.—Develop a plate as usual, wash 1 min. and back it with a sheet of thick wet black paper to prevent access of light from behind, then expose to light. Dissolve the reduced Ag in acidified $KMnO_4$, remove stain with $NaHSO_3$, rinse, fix in 10% hypo, then wash thoroughly. A second development in a metol-HgBr developer, 1–1.5 hrs., gives an image with fine details and blacks as vigorous as in the ordinary case. L. DERR.

Utocolor Paper. F. LIMMER. *Phot. Rundschau*, **25**, 257–60.—Description and working directions of the improved Uto bleach-out paper, now obtainable with the necessary accessories from the Société anonyme Utocolor, La Garenne-Colombes (Paris). Brilliance of image is enhanced in the new product, but the colors are not yet fast to light. L. D.

Demonstration and Measurement of Photochemical Action in Ultraviolet Light. C. SCHALL. *Z. wiss. Phot.*, **10**, 89–116.—The splitting off of O and halogens from *p*-phenylenediamine, benzidine and symmetric acetylene tetrabromide is shown by the change in color during exposure to ultraviolet light. For diamine nitrate and tetrabromide the process is a monomolecular one, and equal quantities of light-energy disassociate equal masses of O or Br. With *p*-phenylene mononitrate the change in color for equal amounts of light-energy, using different exposures, was constant within the limits of error of the experiments, whence it follows that equal quantities of light split off equal masses of O from the nitrate groups of phenylenediamine salts; and similar results were obtained for acetylene tetrabromide in transparent films. Examined spectroscopically, ordinary celloidin photographic papers were found more sensitive to visible wave-lengths, less so to ultraviolet than diamine. L. D.

Classification of Photochemical Reactions. F. WEIGERT. *Z. wiss. Phot.*, **10**, 1–16.—A classification of chemical light-reactions from the energy standpoint, into endothermic and exothermic reactions, with corresponding entropy changes. L. D.

Three-color Transparencies. F. LEIBER. *Phot. Rundschau*, **25**, 269–71.—Instead of superposing three prints, red, blue and yellow, the blue and yellow are put upon one plate, improving the transparency of the finished picture. A lantern-slide positive from the blue-filter negative is bleached in 10% $K_4FeC_6N_6$ and 10% $PbNO_3$ acidified with AcOH. After drying it is immersed 1–2 min. in 10% ammonio-ferric

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citrate and dried in the dark, then exposed under the red-filter negative. Immersion in 10% $K_4FeC_6N_6$ develops the blue picture, and, after rinsing, a 3% $K_2Cr_2O_7$ bath develops the yellow picture on the same plate. L. D.

Dry Plate for Photochemical Line and Screen Work. R. JAHR. *Z. Reproduktionstechnik*, 13, 167–8.—They are recommended instead of wet collodion plates, as being available in summer, and cheaper. L. D.

Production of Duplicate Negatives. E. STENGER. *Z. Reproduktionstechnik*, 13, 164–5.—This instalment deals with the lateral inversion of the image by mirror or prism. L. D.

Recent Theories of the Photchemical Processes in the Silver Bromide Gelatin Plate. A. P. H. TRIVELLE. *Jahrb. Radioakt. Elektronik*, 8, 334–83.—A summary. H. S.

Colloid-chemistry and Photography. H. LÜPPO-CRAMER. Frankfurt. *Z. Chem. Ind. Kolloide*, 9, 22–5.—If drops of water are allowed to diffuse into a pure gelatin plate, and the plate then allowed to swell in water, a relief of the first drops is found upon the plate. The same effect produced by light on Ag halide plates has been explained as a tanning of the gelatin by the free halogen. AgI-Br, -Cl, -CN, -SCN, $-PO_4$, $-C_2O_4$, citrate HgI_2 and HgI all show the same relief formations if the plates and atm. are sufficiently dry. Since the relief formation is not changed by previously bathing the plate in a 2% $AgNO_3$ soln. or a nitrite, it is not due to the action of a free halogen. The Ag salt may be dissolved away after the exposure to light, without destroying the relief. The deformation of the gelatin occurs during the exposure and is then permanent. The action of light probably causes a rearrangement of the Ag salt, with decrease in vol. and a corresponding shrinkage of the surrounding gelatin, which is a permanent "coagulation" similar to tanning. H. ISHAM.

U. S., 1,010,141, Nov 28. A. HERZKA, Dresden, Ger. **Photographic plate** comprizing a transparent support, a thin light-absorbing layer on each face of the support, and a coating of sensitized emulsion on one of the layers (cf. *C. A.*, 5, 3205).

U. S., 1,010,200, Nov. 28. J. SURY, Wyneghem, and E. BASTYNS, Antwerp, Belgium. **Treating photographic paper** to prevent shrinkage during printing, by subjection to a tannin or CH_2O soln., drying, and coating the back of the paper with a gum soln.

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7. ANALYTICAL CHEMISTRY.

E. G. R. ARDAGH.

Determination of Tungsten in Wolframite in the Presence of Molybdenite. W. TRAUTMANN. *Z. angew. Chem.*, 24, 2142.—W ores always contain from a trace to over 5% MoS_2. The ordinary methods are tedious. T. claims the following method to be accurate enough for technical work: Roast 1 g. of the finely powdered ore gently for about 10 min. in a Pt crucible and extract with warm, weak NH_4OH. Traces of MoO_3 remain with the WO_3 which is unattacked. To get the WO_3 into soln. T. prefers the $NaKCO_3$ fusion to Na_2O_2 or Na_2CO_3 + KNO_3, but he obtained the best results by fusing with pure Na_2CO_3 in a Ni crucible at the highest permissible temp. No figures are given. E. G. R. ARDAGH.

A Method for the Accurate Volumetric Determination of Oxygen in the Air. H. E. WATSON. *J. Chem. Soc.*, 99, 1460–6.—This is devized to furnish a rapid and accurate method for use in a study of the comp. of air at different altitudes. It aims at avoiding the difficulties of the methods of Regnault and De Saussure, and the preliminary analytical data cited indicate that this has apparently been realized. The O

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is absorbed by P, and the change in pressure at const. vol. and temp. is measured. The construction and operation of the app. are given. M. C. BOSWELL.

Quantitative Determination of Copper in Commercial Sulfates with Alkaline Hypophosphites. A. CAVAZZI. *Gazz. chim. ital.*, **41**, II, 374–8.—Attention is called to the papers on this subject published by the author in the *Rend. accad. sci. Bologna* in 1900–2, and the method of analysis is again described. CHAS. A. ROUILLER.

Precipitation of Zinc, Manganese, Cobalt, Nickel, Copper and Cadmium from Ammoniacal Solution with Sodium Carbonate and Trimethylphenylammonium Carbonate. E. SCHIRM. *Chem. Ztg.*, **35**, 1177, 1193–4.—All of these metals can be pptd. quant. in a granular form from their ammoniacal solns. by b. with Na_2CO_3, the process being especially suitable for their quant. sepn. from SO_4. Expts. with $ZnSO_4$ showed that the sepn. of the Zn and SO_4 was quant., but that the Zn ppt. contained considerable occluded Na, probably as zincate. To avoid errors due to such occlusion $[C_6H_5(CH_3)_3N]_2CO_3$ was substituted for Na_2CO_3, when the ppt. of basic $ZnCO_3$ was found to be free from SO_4, and the occluded organic base was volatil. Satisfactory results were obtained by the following method: The soln. containing $ZnSO_4$ was pptd. cold with slight excess of a soln. of $[C_6H_5(CH_3)_3N]CO_3$, then $(NH_4)_2CO_3$ soln. added till the ppt. disssolved, heated to b., more $(NH_4)_2CO_3$ being added to keep the soln. clear till after a few mins. b. Finally the soln. was boiled till all NH_3 was expelled (1½ hrs.), the ppt. filtered out, washed, dissolved in HNO_3, evapd. and weighed as ZnO. SO_4 was detd. in the filtrate by pptn. with $BaCl_2$ added drop by drop. WILLIAM BLUM.

Roasting of Complex Ores in Assaying. J. M. NEWMAN. *Mining Sci.*, **64**, 394.—The "roast before fusion" assay is condemned as erroneous especially with rich ores. N. recommends oxidizing sulfides, arsenides, etc., during the fusion by Pb oxide, discontinuing the use of Fe nails. On ores assaying from 5 to 20 oz. Au and 6% sulfotellurides the charge consisted of 1 A. T. ore, 150 g. litharge, borax soda, flour sufficient to give a clean Pb button 60–70 g. This button was then scorified down to 10–12 g. and cupelled. E. J. ERICSON.

Cupellation. R. C. BENNER AND M. L. HARTMANN. *J. Ind. Eng. Chem.*, **3**, 805–7.—Comparative Ag losses on 40 mg. Ag between cupels of diff. comp. were as follows: Morganite 1.99%, casseite 3.09, brownite 2.89, bone ash 2.36, cement 3.38, equal parts cement and bone ash 2.95. E. J. E.

Practical Suggestion for the Determination of Hygroscopic Power According to Rodowald-Mitscherlich. G. F. v. ROMBERG. *Landw. Vers. Stat.*, **75**, 483–4.—Modifications suggested are as follows: The use of watch glasses instead of supported pans, and a 3-way stopcock between desiccator and manometer. For the third opening, connecting manometer to the free air after the desiccator is evacuated, is attached a small capillary tube, which prevents a sudden inrush of air. For letting air into the desiccator a capillary tube is placed between it and the wash bottles. Metal bands (crosswise) are used to support the evacuated flask to prevent its falling into the water bath. R. O. E. DAVIS.

Qualitative Detection of Nitrogen in Organic Substances. H. BRACH AND E. LENK. *Chem. Ztg.*, **35**, 1180.—Description and illustration of an app. for carrying out Faraday's test for N, *viz.*: Heating with NaOH and testing for evolved NH_3. Glass beads in a small bulb above the heated substance prevent any NaOH from being projected upon the litmus paper which is suspended in a tube connected with a vacuum pump. WILLIAM BLUM.

Direct Determination of Sucrose (PELLET, LEMELAND). **28.** Determination

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of Sugar (TAKAHASHI). 11b. Determination of Sugars (NEUBERG, ISHIDA). 11b. Determination of Ammoniated Mercury (SUTTERHEIM). 17. Determination of Ash (STOLTE). 11b. Occurrence of Nickel in Ferrovanadium (SCHILLING). 9. Testing Transvaal Coals (MURRAY). 21. Estimation of Undissolved Gold (WHITE). 9.

8. MINERALOGICAL AND GEOLOGICAL CHEMISTRY.

ROGER C. WELLS.

Role of Water in Minerals. W. W. COBLENTZ. *J. Frank. Inst.*, 172, 309–36.—Absorption spectra of minerals containing H_2O in various forms of combination were examd. with the following criterion for judging the condition of the H_2O: (1) If absorption spectrum of a compd. is not the composit of absorp. bands of constituent elements, the "physical mol." has been changed; (2) *vice versa*, if the groups of ats. which cause characteristic absorp. bands undergo no physical change when they combine to form a crystal, then absorp. spectrum of resultant combination will be a composit of that of constituents. The spectra of sections of hydrated minerals were compared with those of dehydrated minerals and H_2O. Radiometric test shows a distinction between H_2O of constitution and the following: H_2O of crystn., dissolved H_2O and H_2O of solid soln. The latter 3 forms, however, cannot be differentiated by this method. Absorp. curves are given for H_2O, selenite, anhydrite, opal, muscovite, tremolite and gelatin. Selenite, anhydride and opal show H_2O of "crystn.," muscovite, tremolite and gelatin H_2O of constitution. A. A. KLEIN.

Chemical Composition of Minerals of the Chloritoid Group. E. MANASSE. Univ. Pisa. *Atti. soc. tosc. sci. nat., proc. verb.*, May 7, 1911.—A discussion with chem. analyses of masonite, sismondite, ottrelite and venasquite showing that they all conform to the formula of chloritoid, $H_2R''R_2''SiO_7$, (cf. *C. A.*, 5, 653). R. C. WELLS.

Some Minerals of Tuscany. E. MANASSE. Univ. Pisa. *Atti soc. tosc. sci. nat., mem.*, 27.—A discussion with chem analyses of turgite, goethite, rhodochrosite, jarosite, alunogen and fibroferrite from Elba. R. C. W.

Cassiterite from the Tourmaline-bearing Veins of Elba. P. ALOISI. Univ. Pisa. *Atti. soc. tosc. sci. nat., proc. verb.*, Nov. 13, 1910.—Crystallographic. R. C. W.

Some Minerals from Beaver Co., Utah. B. S. BUTLER AND W. T. SCHALLER. *Am. J. Sci.*, [4] 32, 418–24; cf. *C. A.*, 5, 1245.—The authors describe 4 minerals. Beaverite, a new mineral, occurs with other secondary minerals, in the upper part of the deposit in the Horn Silver mine. It is a hydrous sulfate of Cu, Pb and ferric Fe, canary-yellow, earthy looking material and is very finely crystallized in distinct hexagonal plates. The av. results of analyses are: Insol. 10.05, CuO 9.70, PbO 29.44, Fe_2O_3 17.28, Al_2O_3 3.64, SO_3 21.32, H_2O 9.02. Ratios agree well with the formula $CuO.PbO.Fe_2O_3.2SO_3.4H_2O$ in which a little ferric Fe is replaced by aluminium. The water is all constitutional. The second mineral noted is wurtzite, the hexagonal ZnS. It occurs in considerable abundance in the primary ores of the Horn Silver mine. The third mineral is plumbojarosite, the occurrence of which is interesting in that it has previously been described from only 2 localities: Cooks Peak, N. M. and American Fork, Utah. The analysis is as follows: Fe_2O_3 42.11, PbO 18.32, (K_2O and Na_2O) 0.13, SO_3 27.59, H_2O 9.16, insol. 2.64, ZnO 0.30. It is a secondary mineral. The last mineral mentioned is corkite, a hydrous phosphate and sulfate of Pb and Fe. It was collected from the Harrington-Hickory and the Wild Bull mines, the only localities on this continent from which this mineral has been reported. Corkite is a secondary mineral. J. H. BOWER.

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The Scapolite Group. ALFRED HIMMELBAUER. *Jahrb. Min.*, 1911, i, ref. 22–28, from *Sitsungsber. Akad. Wiss. Wien*, [1] 119, 65 pp. (1910); through *J. Chem. Soc.*, 100, 297.—The results indicate that the following members of the scapolite group form an isomorphous series of mixed crystals of which the end members are: Meionite, $2CaAlSi_2O_8$, + $CaAl_2Si_2O_9$ and marialite, $2NaAlSi_2O_8$ + $NaAlSi_2ClO_8$. Analyses of samples follow: I. Scapolite, Malsjö, Sweden; II. scapolite, Arendal, Norway; III. scapolite, Gouverneur, N. Y.; IV. meionite, Vesuvius; V. scapolite, Grasse Lake, N. Y.; VI. scapolite, Bolton, Mass.; VII. scapolite, Gulsjö, Sweden; VIII. couzeranite, Ariège; IX. marialite, Pianura, near Naples.

	SiO_2.	Al_2O_3.	Fe_2O_3.	CaO.	MgO.	Na_2O.	K_2O.	Cl.	SO_3.	CO_2.	H_2O.	Sp. gr.
I	52.48	25.56	0.39	12.44	..	6.52	0.79	0.70	0.58	0.14	0.61	2.675
II	52.57	24.24	0.26	11.57	..	7.19	0.42	1.63	0.90	0.39	0.69	2.676
III	52.65	25.32	0.11	11.30	0.23	6.64	1.58	2.14	0.14	..	0.42	2.660
IV	41.42	...	..	...	..	..	..	..	..	..	..	...
V	47.30	25.99	0.32	17.34	0.15	..	..	..	..	..	..	2.713
VI	47.09	25.39	0.10	16.62	0.20	..	..	..	..	..	..	2.736
VII	51.09	23.86	0.16	12.40	0.02	..	..	..	..	..	..	2.668
VIII	56.67	19.47	0.20	7.08	0.23	..	..	..	..	..	..	2.625
IX	59.29	22.66	..	2.74	..	..	..	..	..	..	..	...

The d. of pure meionite should be 2.815 and pure marialite 2.560. Numerous values of physical consts. are given. Detns. of the comp. of the silicic acid by Tschermak's method gave metasilicic acid ($H_{12}Si_6O_{18}$) for the Vesuvian meionite, and for the other mixts. of $H_{12}Si_6O_{18}$ and $H_{10}Si_5O_{25}$. E. J. WITZEMANN.

Explanation of the Course of the Crystallization of Potassium Salts from Solution. H. E. BOEKE. Leipzig. *Chem. Ztg.*, 34, 1093.—A method of graphic representation is discussed. E. J. W.

Results of Deep Boring for Potassium and Rock Salts in the Tertiary of Upper Alsace. B. FÖRSTER. Pasing, near München. *Mitt. Geol. Landesanstalt Elsass-Lothringen*, 7, 349–524.—Alternate encroachments and recessions of the sea caused a variety of strata to be formed including evapn. deposits resembling those at Stassfurt.

R. C. WELLS.

Rock Crystals: Its Structure and Uses. A. E. H. TUTTON. *J. Roy. Soc. Arts*, 59, 1076–85, 1091–1100; cf. *C. A.*, 6, 64.—This paper deals with the behavior of light on passage through quartz. Airy's spirals and other methods of detg. the rotation of the plane of polarization, various twinning laws observed on quartz with their optical relations and the pseudo-racemic nature of the amethyst variety. The third paper states the application of quartz to both scientific and artistic purposes, as well as to industry and the advantages derived therefrom, deals with an interference tripod of quartz used in the measurement of interference bands, the use of quartz as a standard of wt. and length, and silica glass and its varied applications. A. A. KLEIN.

Chemical and Lithological Examination of the Meteorite at El Nakhla. S. MEUNIER. *Compt. rend.*, 153, 785–9.—This meteorite is of a new lithological type. It is cryst., its surface often shows large cleavage faces and its color is grayish green. It is very friable and porous. Under the microscope it shows elastic structure. D. = 3.388. In the blowpipe flame, it was difficultly fusible to a very brilliant black enamel. Analysis gave: SiO_2 47.40%, Al_2O_3 0.69, Fe_2O_3 20.80, CaO 15.20, MgO 14.61, Na_2O and K_2O 0.05, MnO 0.85, sum 99.60%. This is almost the comp. of certain varieties of terrestrial hypersthene and the exam. of a thin section verifies this. Nakhlite is classified with chladnite from which it differs by the substitution of hypersthene for enstatite.

A. A. K.

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Spectrophotometric Determination of Xenon. Constancy of the Ratios: Xenon: Argon and Xenon: Krypton in Natural Gaseous Mixtures. C. MOUREU AND A. LEPAPE. *Compt. rend.*, **153**, 740–3.—The method of detg. Xe depends upon the comparison of the intensity of the blue-indigo ray 4671.42 of Xe with that of mixts. A and Xe of known comps. Seventeen gases of thermal source and 1 volcanic gas were examd. Although amts. of Xe varied according to the source, the ratios Xe : Ar and Xe : Kr tend toward a const. A. A. K.

Diffusion of Boric Salts in Potassium Salt Deposits. W. BILTZ AND E. MARCUS. *Z. anorg. Chem.*, **72**, 302–14.—The authors have made a systematic exam. of the various zones occurring in the Stassfurt, Vienenburg, Aschersleben and other German K salt deposits. The % B_2O_3 at various depths is given and the significance discussed. A. A. K.

Sulfides of Iron and their Genesis. E. T. ALLEN. *Mining Sci. Press*, **103**, 413–4.—Certain deposits of pyrite and marcasite have been pptd., after reduction by carbonaceous matter, from cold, surface solns. of $FeSO_4$ obtained from the oxidation of older deposits of FeS_2 by atmospheric O. This reduction may be assumed to take place thus: $7C + 4FeSO_4 = 2FeS_2 + 2FeCO_3 + 5CO_2$. $Fe_2(SO_4)_3$ has been reduced by H_2S to $FeSO_4$ with formation of free S, and the further action of H_2S and S results in the reaction: $FeSO_4 + H_2S + S = FeS_2 + H_2SO_4$. A high temp. (above 100°) and absence of acid favor the formation of pyrite; otherwise marcasite is formed. At 450° marcasite if transformed into pyrite with the evolution of heat. Pyrrhotite, which has a somewhat variable comp. is a solid soln. of S in FeS, the formula being $(FeS)S_x$. It may be formed from pyrite by heating the latter in H_2S at 570° or above. The max. amt. of S dissolved at 600° is about 6%, which agrees well with the comp. of natural pyrrhotite. It is also probable that pyrite decomposes into pyrrhotite and S. EDW. WOLESENSKY.

New Investigations on the Gas of the Boraciferous Soffioni of Larderello. C. PORLEZZA AND G. NORZI. Ist. chim. gen univ. Pisa. *Atti accad. Lincei*, **20**, II, 338–42; cf. *C. A.*, **5**, 3375.—The gas has the following % comp.: CO_2 92.2, H_2S 2, CH_4 1.78, H 2.45, O 0.18, N 1.35, A 0.0245, He 0.0155. One cu. m. contains about 4.8×10^{-7} cm. radioactive emanation. C. A. ROUILLER.

Alluvial Gold Deposits in Quebec. F. CIRKEL. *Eng. Mining J.*, **92**, 1035–38.—The following general succession of superficial deposits in ascending order is usually observed: (1) Decomposed country rock; usually auriferous, rusty and much oxidized. (2) Cemented gravel; stratified, rusty and Au-bearing. (3) Stratified alluvial clay; sandy, alternating with gravel, sometimes carrying fine colors of Au. (4) Glacial boulder clay, carrying no Au. (5) Stratified gravel, cemented, carrying Au in some regions. (6) Sand and gravel in alluvial layers. R. KANN.

Phosphorus in Coal (CATLETT). **21**.

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9. METALLURGY AND METALLOGRAPHY.

WILLIAM BRADY, WILLIAM T. HALL.

Cyanide Tailings Disposals in Mexico. ANON. *Met. Chem. Eng.*, **9**, 588–90.—Replies to questions to mill owners relative to possible injurious effects of KCN in discharged slimes on water in rivers and vegetation. Most mills discharge into rivers; a few keep them to be reworked in the future should it become feasible. Organic matter in the rivers and the CO_2 present in the atm. decompose cyanides and purify the waste mill solns. and render them harmless. E. J. ERICSON.

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Catching Flue Dust in Metallurgical Processes. A. RZEHULKA. *Z. angew. Chem.*, 24, 1803–7.—All known practical dust-catching apps. depend on one or several of the following methods: Cooling the gas by surface contact; diminishing the suction; sudden change of direction; filtering; washing and spraying the gas with water (used extensively). Elec. pptn. is one of the latest proposals but not yet applied on a large scale. E. J. E.

A Brief Review of Flue-gas Treatment. EDIT. *Eng. Mining J.*, 92, 1115–6. ROBERT KANN.

Losses in Cyanidation. H. FORBES JULIAN. *Mining World*, 35, 1072–3.—J. presents curves showing the rate of formation of cakes in filtration of slimes and gives reasons for the superiority of vacuum over high-pressure filters in the treatment of cyanide pulp. He believes "repptn." to be due to local action of both physical and chem. nature. Graphite, charcoal, tellurides, sulfides, arsenides, greases, oils and even SiO_2 and Al_2O_3 in extremely fine state of division are said to ppt. Au and Ag from working cyanide solns. and these ppts. show little or no tendency to redissolve in the same soln. If this pptd. metal be filtered, washed and repulped with a fresh soln., a portion dissolves. Similar successive treatment dissolves nearly all the "repptd. metal." The vacuum filter makes it economically possible to apply fresh solns. continuously without the necessity of repulping. A curve showing the efficiency of the procedure is appended. J. S. GOLDBAUM.

Premature Precipatation of Gold in Cyanidation. R. STUART BROWNE. *Trans. Am. Metallurg. Soc.*; through *Mining World*, 35, 1108.—B. proposes the term "premature precipitation" as a more accurate description for the phenomenon known as "reprecipitation." Various substances are believed to induce premature pptn. (see preceding abstr.). Of these C in the form of charcoal is the most important. There are 3 possible reasons for its action: (*a*) Chem. action; (*b*) C is passive and the action is brought about by osmotic pressure which is set up when the soln. passes through the pores of the charcoal; (*c*) reaction with occluded gases. B. dismisses the first reason as untenable, and believes that premature pptn. is due to a reaction between $KAuCy_2$ and occluded gases under the influence of osmotic pressure. Facts are presented to prove that occluded gas is necessary for the pptn. of the Au. B. admits that this does not account for the supposed action of graphite, arsenides, etc., but questions whether these non-porous substances really are agents causing premature pptn. The subject needs further investigation. J. S. G.

Hardening Small Steel Articles. ANON. *Elektrochem. Z.*, 18, 206. W. E. RUDER.

Note on the Use of Certain Cyanicides in the Estimation of Undissolved Gold. H. A. WHITE. *J. Chem. Met. Soc. S. Africa*, 12, 89–90.—To est. the amt. of undissolved Au at any given moment, it is necessary to stop immediately the action of the cyanide in the portion taken out for assay. Drowning out by excessive dil. is imperfect. Excess of $KMnO_4$ or of bleaching powder soln. destroy the solvent action of KCN immediately. HCHO, and alk. picrates act similarly, but not immediately. The method recommended is to half fill a bucket with clean water, add to it a sufficient excess of $KMnO_4$ and by means of a tube with a flap valve at the bottom, introduce a sample of the pulp below the surface, with as little exposure to air as possible. Fill up with water, settle, wash 3 or 4 times, with addition of a little lime water to facilitate settling, dry out, etc. In the discussion A. F. Grosse stated that he had known of cases where the Au was dissolved but was held back by the slime. In those cases $Fe(OH)_3$ was present. E. WALLER.

Diagram of a Modern Iron Blast Furnace. W. A. SCHLESINGER. Heidelberg.

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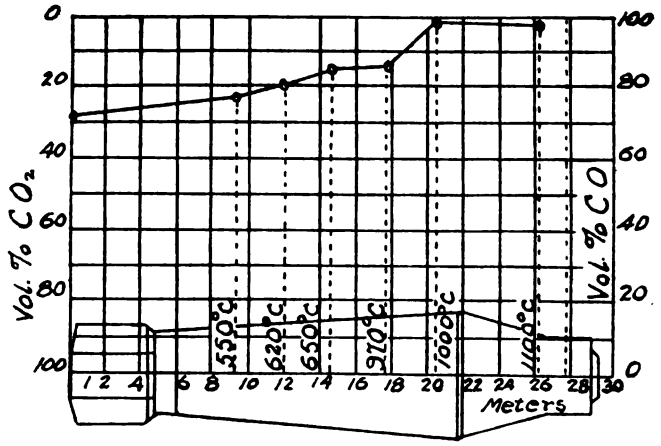
Stahl u. Eisen, 31, 1182–3.—The furnace used was a new 475-ton furnace at the Gute-



hoffnungs Smelter at Oberhausen. Gas samples were taken through holes in the walls of the furnace. E. J. WITZEMANN.

The Melting of Ferromanganese and Desoxidation by the Addition of Molten Ferromanganese. J. BROWN AND W. SCHEMMANN. Rombach. *Stahl u. Eisen*, 31, 1375–6.—Since 1906 the Rombach Smelter Works have been adding melted Fe-Mn at the same time as the converter charge and thus ensuring the complete action of the Fe-Mn on the Fe much better than is the case when the lumps or powder are added. In at least 1000 runs with melted Fe-Mn not a single difficulty was experienced and the last pourings were of the same comp. as the first. All sorts of furnaces were tried but the best results were obtained in elec. arc furnaces with low voltage. Under these conditions 1.5 tons Fe-Mn when maintained in a melted condition continuously for 6 days showed no enrichment in Fe due to loss of Mn. E. J. W.

The Melting of Ferromanganese in the Electric Furnace and the Handling of Melted Ferromanganese. FELIX SCHROEDER. Livet. *Stahl u. Eisen*, 31, 1457–62.—The results discussed are in complete harmony with those of the preceding abstr. The Keller elec. furnace used and the details of operation are described in detail. In this furnace Fe-Mn is melted without loss by volatilization of Mn as is demonstrated by analyses. There is a saving of 35% of the Fe-Mn necessary to obtain the same quality of steel when used in the solid form, and the result is in every case more certain. The cost of melting Fe-Mn when current is worth 0.02 marks per kw. is about 20 marks per ton. E. J. W.

The Briquetting of Ore and Furnace Dust According to Weiss. ERNEST HOLZHÜTER. Charlottenburg. *Stahl u. Eisen*, 31, 1539–43.—This process depends on the action of gaseous CO_2 on $Ca(OH)_2$. The material to be briquetted is mixed with 5–6% hydrated CaO and this is compressed dry into forms at about 300 atms. These are then conveyed through a chamber containing CO_2 at 20 atms. pressure. The plant is described and illustrated. The whole process requires about 4–5 hrs. E. J. W.

The Constitution of the Alloys of Aluminium and Zinc. WALTER ROSENHAIN AND SIDNEY L. ARCHBUTT. Nat. Phys. Lab. *Phil. Trans. Roy. Soc. London*, (*A*) 211, 315–43; *Engineering*, 92, 438–42.—The thermal study of the alloys was carried out by means of cooling curves taken by the "inverse-rate" method. Temp. measure-

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ments were made with a Pt-PtIr thermocouple and a potentiometer. Microscopic exam. of specimens, which had been heated for a long time at certain temps. and then quenched, supplemented and confirmed the results of the pyrometric studies. The constitution of the Al-Zn alloys is more complex than is indicated by the results of Shepherd (*J. Physic. Chem.*, 9, 504). The liquidus corresponds closely to that of Shepherd's diagram except for a small break in the curve of R and A at about 85% Zn. This break together with other evidence leads the authors to assume the existence of a compd. of Al and Zn, probably Al_2Zn_3. The phases which crystallize out along the liquidus are: (1) The α-phase, which is Zn, or Zn with less than 1% of Al in solid soln. (2) The β-phase, Al_2Zn_3. It is characterized by a well marked tendency to crystallize in six-rayed dendrites. Its range of stable existence is 256–443°, being decomposed on heating above the upper temp. into γ and liquid, and on cooling below the lower temp. into 2 phases, α and γ. (3) The γ-phase, which is a solid soln. of Al and Zn containing up to 40% of the latter. The eutectic was found to contain 95% Zn and to freeze at 380°. L. H. ADAMS.

Definit Compounds with Varying Composition of their Solid Phase. II. Electrical Conductivity and Hardness of the Alloys of Magnesium with Cadmium. G. G. URASOV. Lab. Polytechn. Inst., St. Petersburg. *J. Russ. Phys. Chem. Soc.*, 43, 752–71.—U. detd. the elec. cond. and the hardness of alloys of Mg and Cd. A comparison of the cond. and the hardness curves with the solidification curve given by Grube (*Z. anorg. Chem.*, 49, 72) corroborated Grube's assumption that at ordinary temp. these alloys consist of solid solns. of the components in 2 compds.: β-CdMg and α-CdMg. At 25° the solid solns. in the β-Cd-Mg compd. exist in the regions between 0–20 at. % Cd and 82.5–100 at. % Cd, while for the α-Cd-Mg compd. the limits of the region of existence are 22.5–80 at. % Cd. The passage from the β-compd. to the α-compd. is indicated by sudden changes in the direction of the curves. As the temp. rizes these changes gradually diminish and the points at which they occur are displaced in the direction of 50 at. % Cd. At 255° the breaks in the curves disappear entirely, indicating conversion of the α- into β-compd. and complete miscibility of the latter with the components. It is also shown that, in accord with the previously established rule, to the max. in the cond. curve correspond minimum on the hardness curves.
H. M. GORDIN.

The Endurance of Metals. Univ. College, London. E. M. EDEN, W. N. ROSE AND F. L. CUNNINGHAM. *Engineering*, 92, 575–80, 612–3.—The tests described were to det. the form of the stress-repetitions curve for any material and to detn. the effect of the rate of alternation on the stress-repetitions curve and of the limiting resistance for an indefinit number of repetitions. The comparative endurance of various materials, the effect of rests, vibrations, surface, form of test piece and of annealing were studied. Finally the results are compared with those obtained by other investigators.
W. T. H.

Volume Changes in he Alloys of Copper with Tin. J. L. HAUGHTON AND T. TURNER. *Engineering*, 92, 609–11, 646–8.—Alloys were prepared of purest Cu and Sn. It was found, as pointed out by Murray, that the vol. change during solidification is closely related to the crystn. interval but it was not detd. what this relation is. Allotropic changes during and after solidification cause variation in the coeff. of expansion. The hardness curves obtained do not fit in with the theory of Kurnakov and Zemazuzny.
W. T. H.

The Comparative Merits of Cast Iron and Steel Pipes. N. S. HILL. *Eng. News*, 66, 593; cf. *C. A.*, 5, 2802.—Economy often justifies the use of steel pipes for large supply mains but in clay, or wet soil, riveted steel pipe should never be used; where

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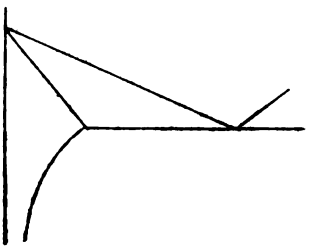
ermanency is a prime consideration, our present knowledge indicates that cast-Fe ipes are preferable for this purpose. W. T. H.

The Electrolytic Corrosion of some Metals. G. R. WHITE. Cornell Univ. *J. Physic. Chem.*, 15, 723–92.—The electrolytic corrosion was studied of Zn, Cu, Sn, d, Fe and Ni used as anodes in solns. of Na acetate, tartrate, chloride, sulfate, and itrate. The electrolysis was carried out usually at room temp., the solns. were stirred y rotating the anode, and the current was detd. by a Cu coulometer, besides being ontrolled with the aid of an ammeter. After the electrolysis, the oxide deposit as removed mechanically and the loss in wt. compared with the wt. equivalent to the u deposit in the coulometer. The metals were found to corrode to different extents n different solns. although some metals corroded equally in 2 or even 3 different elec-rolytes. Sometimes the corrosion was equivalent to the Cu deposited in the coulometer, ometimes very much greater, and sometimes very much less. Slight, if any, corrosion ook place when the metal became passive, because of the oxide film on the anode in-reased corrosion occurred when a compd. was formed in the soln. having a lower valence han that usually obtained with the metal. With Cu about twice the theoretical corrosion was obtained in NaCl soln. and only from 30 to 50% of the theoretical corrosion n NaI soln. With Ni the effect of NaCl as an "exciting salt" during electroplating s explained by the expts. showing that corrosion is normal in NaCl soln. but the Ni becomes passive in soln. of Na acetate, tartrate, sulfate and nitrate. Similarly with Fe, the anode remained active in the solns. of NaCl and Na_2SO_4 but passive in solns. of nitrate, acetate and tartrate. The expts. with Cd indicate that the following re-action tends to take place at the anode: $Cd + CdSO_4 = Cd_2SO_4$. The influence of the surface of the metal, varying the conc. of the electrolyte, changing the current d. and raising the temp. was also studied. W. T. H.

The Failure of a Brazed Joint. H. LOUIS. *Metal Ind.*, 9, 470–1.—An explosion of a steam pipe on a steamship was found to be due to a corroded brazing. A polished and etched specimen of the uncorroded alloy showed the presence of a net-work of whitish alloy. Brass alloys of similar comp. were prepared and, by gripping the metal button in close contact between the jaws of a Cu clip, it was possible to obtain similar results on etching the polished alloy. This is termed "galvanic etching." L. believes that the presence of Pb in the original brass was the cause of the trouble. Probably an alloy of Pb-Sn was formed which was more fusible than the brass so that it solidi-fied about the crystals of brass and the planes thus formed constituted planes of weak-ness. Liquids capable of dissolving Pb attacked this white alloy and caused the dis-integration of the brazing. W. T. H.

The Nature of the Transformation in Solidified Lead-Tin Alloys. D. MAZZOTTO. Phys. Inst., Univ. Modena. *Intern. Z. Metallog.*, 1, 289–346.—The Pb-Sn alloys show a reversible recalescence phenomenon somewhat below the eutectic temp. This has received considerable attention from different investigators of late and two promi-nent explanations have been advanced, *viz.*: (1) By Rosenhain and Tucker favoring allotropism, and (2) by Degens, involving chem. transformation. These theories are critically dis-cussed and new facts are presented in support of a simpler and more consistent interpretation of the equilibrium in this system. The transformation itself was studied in a typical alloy (containing 33.3% Sn) and the heat equivalents of transformation under varying thermal treatment calc. by a method in which time of cooling of the alloy and of Hg under the same conditions were differentiated. Well de-



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fined conclusions, too lengthy to be quoted here, argue for the type of equil. represented by the figure. It is particularly noteworthy that the temp. and intensity of transformation are greatly influenced by the rate of cooling (time and temp. of annealing) and that annealing at near-eutectic temps. raises the temp. of and intensifies the transformation. As is well known, such conditions are closely associated with this type of equil., *viz.*, to obtain max. satn. of the solid soln. at any temp., a more or less extended period of exposition at the given temp. is required. Max. satn. at the eutectic temp. occurs at 18% Sn and, as should be the case, heat evolution on cooling; alloys containing less than this amt. of Sn begins at lower temps. An inconsistency lies in the fact that the alloys begin to evolve heat on cooling only after the temp. has fallen well below the eutectic value. Undercooling and incomplete satn., however, offer an unconstrained explanation of this condition. C. H. MATHEWSON.

Study of the Structure of Galvanized Iron. W. GUERTLER. Research Lab. App'd. Chem., Mass. Inst. Tech. *Intern. Z. Metallog.*, 1, 353–75.—The 2 chem. compds., $FeZn_3$ and $FeZn_7$, described by v. Vegesack (*C. A.*, 1, 710) were identified by metallographic methods in galvanized material. The former is found as an intermediate layer between the Fe and the Zn coating in galvanized Fe prepared by dipping, sherardizing, or by the electrolytic method This constituent is more electronegative than either Zn or Fe and acts as the negative pole of local galvanic cells, thereby accelerating corrosion. On objects which have been galvanized by dipping, the intermediate layer shows a series of crater-like holes through which the H, which had been absorbed during pickling, made its escape when the material was immersed in the molten Zn. The number of these craters in the intermediate layer dets. the number of individual Zn flowers, or crystals, which will appear on the surface. On sherardized material the intermediate layer appears fissured, somewhat like dried clay, and the outer skin is porous. The outer skin produced in electro-galvanizing is also porous. The outer skin of dipped material shows characteristic needles of $FeZn_7$ which are also electronegative to Zn and accelerate corrosion. Abs. superiority could not be ascribed to any one of the 3 types of material. C. H. MATHEWSON.

The Arsenides of Tin. N. PARRAVANO AND P. DE CESARIS. Chem. Inst., Univ. Rome. *Intern. Z. Metallog.*, 2, 1–12; see *C. A.*, 5, 3386. C. H. MATHEWSON.

The Life History of Cells and Grains in Steel. H. M. HOWE. *Intern. Z. Metallog.*, 2, 13–25.—The changes which take place in hypo-eutectoid steels during rise and fall of temp. are minutely described chiefly with reference to grain and cell size. The term *grain* is applied to pure Fe, or ferrite, (within the hypo-eutectoid range) corresponding to the cryst. individuals or grains making up a pure metal. Cells are bounded by walls of ferrite (or cementite) and consist essentially of pearlite. Both grain size and cell size increase not only with the temp. reached when above the critical range, but with the length of exposure to that and neighboring temps. Growth of the grains by change in orientation and coalescence is natural and easily understood; the coarsening of cell structure by long and high heating above the critical range involves other changes. When the steel is heated above the critical range the structure becomes homogeneous and large grains (of austenite) can form by coalescence. On cooling, these large grains det. coarser cell structure in the resulting inhomogeneous material formed when the critical range is again traversed. "The effect of high and long heating in coarsening the ferrite grains, in increasing the area free from visible ferrite in the air-cooled steel, in lowering the critical range, in increasing the stability of the red-hardness of high-speed steel and the stability of the cellular structure, in increasing the massing of ferrite and cementite into the octahedral cleavages of the austenite, and in retarding the coagulation of sorbite into pearlite, represent the greater perfection, efficiency, and stability of the cryst. organization reached in the austenite

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stage, this stability giving the austenite structure great pseudomorphous restraining power *de facto*, even after its existence *de jure* has ceased with the passage to below the transformation range. The influence of Mn in emphasizing the cell structure is simply one aspect of its general retarding and sluggardizing effect. It so retards the structural evolution that we more readily find the steel in the early stage in which the cell structure is prominent." C. H. MATHEWSON.

Formation of Metallic Solid Solutions by Diffusion in the Solid State. G. BRUNI AND D. MENEGHINI. *Intern. Z. Metallog.*, **2**, 26-35.—See *C. A.*, **5**, 3365. C. H. MATHEWSON.

Allotropic Forms of Metals. E. COHEN. *Electrician*, **67**, 554.—Researches of the last few years make it probable that all elements show allotropy. Allotropy is now considered an equil. phenomenon. Monotropy is illustrated by "explosive Sb," metastable at all temps. and enantiotropy by Sn which is unstable in the ordinary condition when below 18°. White and violet P are typical cases of dynamic allotropy. C. N. MOORE.

Zinc, Lead and Tin Alloys. M. LEVI-MALVANO AND O. CECCARELLI. Ist. chim. r. univ. Roma. *Gazz. chim. ital.*, **41**, II, 314-8.—The hardness of nearly 100 ternary alloys of these metals is given. CHAS. A. ROUILLER.

Occurrence of Nickel in Ferrovanadium and its Determination in the Same. H. SCHILLING. *Chem. Ztg.*, **35**, 1190.—Two of 5 samples examd. showed presence of Ni to extent of 2.85% and 0.91% resp. The importance of Fe-V in the manuf. of steel makes the estn. of Ni important. Brunck's method which follows, gives quick and accurate detns.: Dissolve 1 g. of the very finely divided Fe-V in 30 cc. HCl (d. 1.12), oxidize by the addition of HNO_3 (d. 1.4), evap. and roast till the nitrate is decomposed. Dissolve the residual oxide in cold HCl (d. 1.12), filter off the SiO_2 and wash with hot dil. HCl. To the filtrate add 20 cc. AcOH (1-5), make slightly ammoniacal, and ppt. the Ni with a 1% alc. soln. of dimethylglyoxime. Filter red ppt. through a Neubauer crucible, wash with hot water till free from Fe and heat to const. wt. in air bath at 110°. The dry ppt. contains 20.31% Ni and is free from V. M. WILLIAMS.

Strains in Boiler Plates. E. HEYN AND O. BAUER. *Stahl u. Eisen*, **31**, 760-5. E. J. WITZEMANN.

Figures from Rolling in a Cross Section of a Rail. R. LOEBE. Berlin. *Stahl u. Eisen*, **31**, 792-4.—An illustrated description of some unusual figures. E. J. WITZEMANN.

Corrosion of Wrought-iron Pipes and Cast-iron Valves when Heated by Dry Steam. F. WESTHOFF. Düsseldorf. *Stahl u. Eisen*, **31**, 1043.—When the Na_2CO_3 used in the boiler water became conc. in the boiler, it was carried over in the steam pipes; only those containing wet steam were uncorroded. Either $Na_2CO_3 + H_2 \longrightarrow 2NaOH + CO_2$ at this temp. and pressure and the CO_2 attacks the iron or the Na_2CO_3 itself has a corroding action. E. J. WITZEMANN.

Utilization of Gases (LURMANN). 21.

U. S., 1,009,750, Nov. 28. W. HOMMEL and H. T. DURANT, London, England. **Cyclic process for extracting zinc from sulfide ores** in which the only reagents employed are H_2O and those supplied by the ore itself, consisting in roasting the ore to drive off gases containing SO_2, cooling the gases and bringing them into contact with a mixt. of the roasted ore and H_2O to dissolve the Zn as sulfite and then subjecting the sulfite

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soln. to the action of the hot gases from the ore roasting furnace to ppt. insol. Zn monosulfite, the hot gases being enriched in SO_2 and cooled ready for the further treatment of the mixt. of roasted ore and H_2O.

U. S., 1,009,863, Nov. 28. O. SCHNEEMILCH, Wilhelminenhütte, Ger. **Furnace for obtaining zinc from ores,** comprizing a chamber to which hot gases are admitted, vertical retorts passing their whole length freely through the chamber so as to be surrounded by the hot gases over their entire length and connections such that the retorts can be removed from below the chamber.

U. S., 1,009,864, Nov. 28. G. SCHNEIDER, Friedeburg, Ger. **Treating copper carbonate ores for the production of verdigris,** by treating the ore with a 15% soln. of HOAc, removing by distillation the free HOAc in the soln. thus obtained, pptg. the impurities such as Fe, Al, Ca, etc., by adding a carbonate and recovering the verdigris from the purified soln. by crystn.

U. S., 1,009,906, Nov. 28. H. W. KENT, Milwaukee, Wis. **Treating ores of gold and silver** by reducing mechanically to coarse sizes, roasting, breaking and making brittle by dropping it while still hot into H_2O in a closed chamber, mechanically reducing the mixt. to a pulp in the receptacle without loss of heat and immediately conveying the pulp through a closed conduit and discharging it deeply within a body of Hg to raise the temp. of the latter and maintain it at the temp. for hot amalgamation without the application of additional heat.

U. S., 1,010,265, Nov. 28. C. F. JENKINS, Washington D. C. **In operating a blast furnace,** applying waste heat from the furnace to distinct units operated by heat to generate O (*e. g.*, from BaO_2) and intermittently and automatically discharging the generated O from the units alternately, in the combustion zone of the furnace.

U. S., 1,010,312, Nov. 28. E. J. PLANCHE, Paris, France. **Preparing bottoms for Thomas steel converters** by pouring and casting a plastic mixt. of crushed dolomite and tar containing about 15% of tar, between the pins and tuyères of the bottoms and baking at a temp. of 300–400°.

U. S., 1,010,347, Nov. 28. J. C. CLANCY, New York, N. Y. **Treating ore containing precious metals** with a non-electrolyzed cyanamide soln. containing a ferro- or ferricyanide.

U. S., 1,010,348, Nov. 28. B. F. COBB, Denver, Colo. **Ore concentrator.**

U. S., 1,010,350, Nov. 28. W. F. DEISTER, Ft. Wayne, Ind. **Slime concentrator.**

U. S., 1,010,490, Dec. 5. O. FRICK, Stockholm, Sweden. **In reducing ores in a furnace,** maintaining a continuous circulation through the furnace of a portion of the gas produced in the furnace, heating a second portion of the gas by heat derived from a third portion of the gas, burning it with air heated by another portion of the gas and heating the gas circulating through the furnace by heat derived from said burning, and elec. heating the gas before passing into the furnace.

U. S., 1,010,510, Dec. 5. C. J. MESTA and S. E. DIESCHER, Pittsburgh, Pa. **Making sheets or plates of iron or steel** by hot-rolling, black-pickling, drying at a temp. at which no annealing effect will occur, cold-rolling and annealing.

Can., 135,418, Sept. 5, 1911. C. M. JOHNSON, Avalon, Alleghany, U. S. Reduction of **metallic oxides** especially WO by heating a mixt. of WO and C until C combined with O of the oxide.

Can., 135,505, Sept. 12, 1911. G. WANNASCHAFF and J. SAVELSBERG, Papinburg-on-the-Ems, Ger. **Separation of zinc.** Material is treated with warm H_2O and $ZnCl_2$ yielding a compd. of $ZnCl_2$ and ZnO from which the pure ZnO is sepd. by treating with NaOH.

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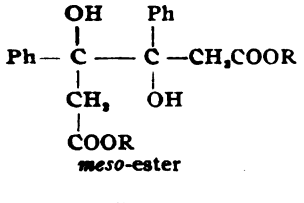
10. ORGANIC CHEMISTRY.

J. BISHOP TINGLE.

Synthesis of Chrysene. ERICH BESCHKE. Univ. Giessen. *Ann.*, 384, 143–72. —The two isomeric *diethyl β,β'-diphenyl-β,β'-dihydroxyadipates*, (I, II), were pre-



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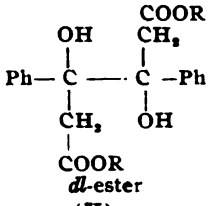

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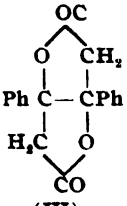
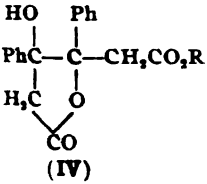


(III)

pared by b. 45 g. benzil, 100 g. ethyl bromoacetate and 42 g. Zn filings with 180 cc. Na-dry C_6H_6 on a water bath until a distinct darkening appeared. The mixture is shaken with ice-cold 15–20% H_2SO_4. The *meso*-ester seps. in cryst. form. Recryst. from C_6H_6, clear prisms, m. 168°. The C_6H_6 soln. on spontaneous evapn. yields the *dl*-ester, fine needles, m. 137°. Total yield, 72%. The *meso*-ester with b. Ac_2O gives a *diacetyl comp.*, long needles, m. 171°. *2,3-Diphenylpentadilactone* (III), was prepared by b. the *dl*-ester with conc. HCl in AcOH. Six-sided transparent tables, m. p. 194°. The *meso*-ester yields salts. *Barium salt*, cryst. Sodium salt, clear rhombs. *Silver salt*, stable in the light. Dry distillation of this salt gives acetophenone, identified by its oxime and semicarbazone. The free *β,β'-diphenyl-β,β'-dihydroxyadipic acid* is obtained by adding a slight excess of AcOH to the Na salt. Fine needles, m. 205°. Loss of water readily occurs through recrystn. Esterification does not yield the *meso*-ester but a new ester containing 1 mol. EtOH less: *ethyl 2,3-diphenyl-2-hydroxybutyrolactone-2-acetate*, (IV) thin white needles, m. 138°. The



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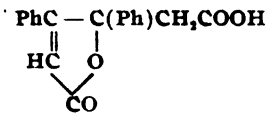

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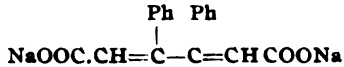
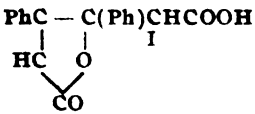


(VI)

ester is saponified by b. with conc. HCl + AcOH. The *free acid*, cryst., m. 179°. *Silver salt*, very soluble and stable in the light. If the saponification is not interrupted at the right time, H_2O is also split off with the production of *2,3-diphenylcrotonolactone-3-acetic acid*, (V), cryst., m. 184°. *Ethyl ester*, hard transparent rhombs, m. 94°. *Silver salt*, difficultly sol. *Barium salt*, cryst. *Bromo deriv.*, $C_{18}H_{12}O_4Br$, cryst. Sodium *β,β'*-diphenylmuconate, (VI), is prepared by b. the ester, m. 94°, in EtO H + conc. NaOH. Fine needles. *Silver salt*, stable in the light. *Ethyl ester*, pale red cryst., m. 140°. *Diethyl ester*, cryst., m. 72°. *Bromo derivative*, $C_{20}H_{17}O_4Br$, large four-sided tables, m. 143°. *Δ_1-2,3-Diphenylcrotonolactone-3-iodoacetic acid* (VII), is pre-



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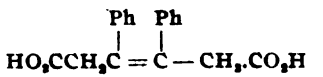

(VIII)

pared by treating the Na salt with KI soln. Colorless rhombs, m. 217°. Sodium

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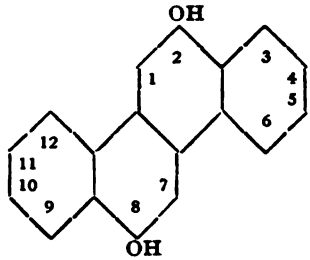
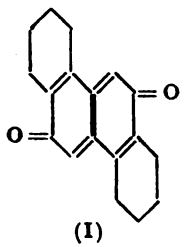
diphenylmuconate on reduction with NaHg gives *α,α'-dihydro-β,β'-diphenylmuconic acid* (VIII), which occurs in two isomeric forms, sepd. by the greater insolubility of one, m. 297°, in EtOH. This acid gives a *silver salt* and an *ester*, cryst., m. 86°. The more sol. ester m. 195°. *Silver salt* and *ethyl ester*, cryst., m. 56°. If the acid, m. 297°, is heated with Ac_2O, and a little H_2SO_4 the *diacetyl derivative* of 2,8-dihydroxychrysene is obtained. Silky needles, m. 246°. This is best converted into *2,8-dihydroxychrysene*, (IX), by b. with EtOH + H_2SO_4. Small colorless cryst., without



m. p. Its dil. alk. soln. is golden yellow but this is at once changed to an intense blue color by O of the air. Treatment with diethyl sulfate gives the *diethyl ether*, $C_{22}H_{20}O_2$, fine white needles from AcH, m. p. 207°. The solns. show a strong blue fluorescence. *Dibenzoyl derivative*, $C_{32}H_{20}O_4$, cryst., m. 280°. The hydroxy chrysene or its diacetyl deriv. is converted into chrysene, $C_{18}H_{12}$, by heating with Zn dust. Chrysene, m. p. 250°, was fully identified by conversion into its picric acid deriv., and into chrysene quinone, m. 235°. ALVIN S. WHEELER.

2,8- or *amphi*-Chrysenequinone. ERICH BESCHKE. *Ann.*, **384**, 173–92.—*2,8- or amphi-Chrysenequinone* (I), is prepared by b. a suspension of 5 g. 2,8-dihydroxy-



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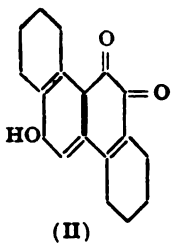

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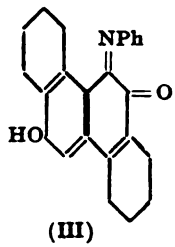

(III)

chrysene in 400 cc. AcOH with PbO_2. The dihydroxychrysene disappears in a few minutes and the quinone sepn. rapidly in glistening reddish yellow needles, m. 288–90° (with decomp.). Very insol. except in AcOH and C_6H_6. Readily reduced to its hydroquinone with a conc. aq. soln. H_2SO_3. *Sodium bisulfite compound*, $C_{18}H_{10}O_2.NaHSO_3 + 2H_2O$, bright yellow crystals. By b. a suspension of the diacetyl deriv. of 2,8-dihydroxychrysene with aq. NaOH in EtOH the *sodium derivative* of *8-hydroxy-1,2-chrysenequinone* is obtained, best if a stream of air is conducted through the soln. Almost black needles or blue-violet powder. Acidification yields *8-hydroxy-1,2-chrysenequinone* (II), voluminous dark red flocks, insol. and uncrystallizable. It is obtained in dark red needles by oxidation of its hydroquinone. It decomp. above 300° without m. *Acetyl derivative*, $C_{20}H_{12}O_4$, bright red needles, m. 252°. *Ethyl deriv.*, $C_{20}H_{14}O_3$, shining red needles, m. p. 246°. *Benzoyl derivative*, $C_{23}H_{14}O_4$, yellowish red needles, m. 232°. *o*-Phenylenediamine gives *8-hydroxychrysophenazine*, $C_{24}H_{14}ON_2$, yellow needles, m. 292°. *Ethyl derivative*, $C_{26}H_{18}ON_2$, yellow needles, m. 215°. *8-Hydroxychrysenequinonemonoanil*, (III), blue-violet crystals, m. p. 230° with some decomp. at 220°. Ethylaniline gives

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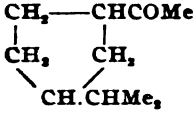
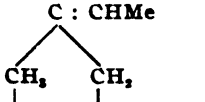
the same product as aniline. The anil with Ac_2O gives an *acetyl derivative*, $C_{20}H_{17}O_3N$, fine bright brown needles, m. 215°. *Triacetyl-1,2,8-trihydroxychrysene*, $C_{24}H_{19}O_6$, colorless, crystals, m. 195°. *Triethyl ether*, $C_{34}H_{34}O_3$, colorless crystals, m. 142°. The solns. show a strong blue fluorescence. In view of the fact that aniline and ethylaniline give the same anil (see above), the action of ethylaniline upon *o*-naphthoquinone was investigated. Aniline according to Liebermann and Jacobson (*Ann.*, 211, 80) gives 2-hydroxy-*p*-naphthoquinoneanil. The same compd. was obtained with ethylaniline but the yield was poorer. ALVIN S. WHEELER.

Terpenes and Ethereal Oils. CVII. Constitution and Synthesis of Pinolone and Dihydropinolon (Acetyl-1-isopropyl-3-cyclopentanone). O. WALLACH. Univ. Göttingen. *Ann.*, 384, 193–208.—*Dihydropinolone* (I), is obtained by reducing pinolone



(I)



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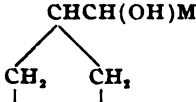
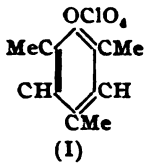


(III)

without a solvent by the Paal method. Liquid, b. 211°, d_{21} 0.8885, n_D^{21} 1.4466, odor of amyl acetate. *Semicarbazone*, m. 164–5°. Dihydropinolone may be converted into β-isopropylcyclopentanone as follows: Treatment with HBrO gives an *acid*, b_{16} 153–6°. *Silver salt*, $C_9H_{15}O_2Ag$. *Amide*, $C_9H_{17}ON$, leaves, m. 164–5°. The amide with Br + KOH gives a base with one less C at. This yields an alc. with HONO which gives with CrO_3 the ketone, 1,3-isopropylcyclopentanone. Dihydropinolone may be synthesized from this ketone, which treated with ethyl bromopropionate and Zn in C_6H_6 gives the hydroxy ester. This is boiled with Ac_2O and then saponified. Dry distillation of the acid in H atm. yields the *hydrocarbon* (II), b. 172–4°, d_{20} 0.809, n_D^{20} 1.4506. The same hydrocarbon was obtained in another way. Dihydropinolone was reduced to *dihydropinolol*, (III), b. 215–6°, d_{19} 0.8920, n_D^{19} 1.4569. This yielded the hydrocarbon through splitting out of H_2O by means of $ZnCl_2$. The hydrocarbon was treated with NOCl in AcOH and then H_2O which threw down an oil, which was b. in AcOH with $MeCO_2Na$, acidified with H_2SO_4, distilled with steam, the distillate extracted with Et_2O, the extract converted into a semicarbazone, m. 182–4°. The ketone was regenerated, and reduced by the method of Paal, giving dihydropinolone. ALVIN S. WHEELER.

Dimethylpyrone. ADOLF BAEYER AND JEAN PICCARD. Chem. Lab., Acad. Sci., Munich. *Ann.*, 484, 208–24.—*2,4,6-Trimethylpyroxonium perchlorate*, (I), is pre-



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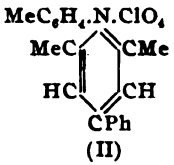

(II)

pared by pouring a soln. of 50 g. MeI + 200 cc. Et_2O and 10 g. Mg into a cooled soln. of 50 g. dimethylpyrone in 500 g. dried anisole. This is after a minute poured into 500 cc. 20% $HClO_4$ at —10°. Yield, 28 g. Colorless prisms, m. 141–51° with decomp. *2,6-Dimethyl-4-phenylpyroxonium*, $C_{13}H_{13}O_4Cl$, leaves, m. 210–2° with decomp. *Picrate*, yellow needles, m. 193°. All salts of pyroxonium derivatives yield readily with NH_3 the corresponding pyridine comp. Trimethylpyroxonium perchlorate gives 2,4,6-trimethylpyridine, identified by its picrate. *Perchlorate*, long needles, m. 243–4°.

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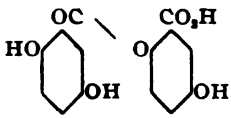
Methylcollidinium perchlorate, colorless prisms, m. 206–7°. 2,6-Dimethyl-4-phenylpyridine. *Toluylcollidinium perchlorate*, $C_{16}H_{18}O_4NCl$, silky leaves, m. 141–2°. *Tolueyl-phenyllutidinium perchlorate* (II), long prisms, m. 205° with previous softening. The splitting off of perchloric acid from dimethylmethoxy pyroxonium perchlorate gives a 1,5-diketone, a class of compds. hitherto unknown in the satd. aliphatic series. The perchlorate is b. in H_2O with $BaCO_3$. Ether extracts a colorless oil of strong peppermint odor. It is unstable and resinifies fully after a few days. The ketone, *Δ^3-4-methylheptenedi-2,6-one* $MeCOCH_2C(Me)CHCOMe$, gives a *di-semicarbazone*, prisms, m. 210–10.5°*e*. *Δ^3-4-Phenylheptenedi-2,6-one*, $C_{13}H_{14}O_2$, colorless cryst. powder, m. 51°. *4-Methylheptanedi-2,6-one* $MeCOCH_2CH(Me)CH_2COMe$, is prepared by the reduction of the unsatd. ketone by the method of Skita with palladium chloride and gum arabic in H atm. under a pressure of 1.5 atm. Colorless oil, m. —10–20°, b_{12} 95–6°. *Disemicarbazone*, warty cryst. aggregates, m. 199°. *4-Phenylheptanedi-2,6-one*, $C_{13}H_{16}O_2$, very large prisms, m. 61–2°. ALVIN S. WHEELER.

Carbomethoxy Derivatives of Phenolcarboxylic Acids and their Use for Syntheses. V. EMIL FISCHER AND KARL FREUDENBERG. Chem. Inst., Univ. Berlin. *Ann.*, 384, 225–44; cf. *C. A.*, 4, 2123.—*Dicarbomethoxydigentisinic acid*, $C_{13}H_{14}O_{11}$, is prepared by the interaction of the monocarbomethoxygentisinic acid, $PhNMe_2$ and PCl_5 in C_6H_6. Colorless needles, m. 166–7°. All m. ps. given are corrected. Gives in H atm. with N—NH_3 and H_2SO_4 *digentisinic acid*, (I), fine needles, m. 208–9° to a yellow liquid.



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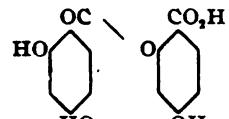

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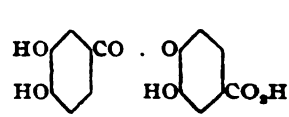

(III)

Dicarbomethoxydi-β-resorcylic acid, from the mono acid, PCl_5, $PhNMe_2$ in C_6H_6, needles, m. 163–4°. Gives in H atm. with NH_3 and HCl *di-β-resorcylic acid* (II), needles, m. 215° with decomp. *Monocarbomethoxyprotocatechuic acid*, $C_9H_8O_6$, obtained by the partial saponification of the dicarbomethoxy comp. with N—NaOH. Crystals, m. 176° with decomp. Methylation with diazomethane yields isovanillinic acid. Gives in Me_2CO in H atm. with N—NaOH and dicarbomethoxyprotocatechuyl chloride the dicarbomethoxy comp. which yields on saponification with NH_3 in H atm. *di-protocatechuic acid* (III), tufted needles m. 237–9° with previous softening. Dicarbomethoxygallic acid was obtained in purer condition than hitherto. Leaves with rounded corners, m. about 180° with decomp. Gives with tricarbomethoxygalloyl chloride and NH_3 in Me_2CO, a current of H and N—NaOH *digallic acid*, $C_{14}H_{10}O_9$, fine needles, m. 282° with decomp. ALVIN S. WHEELER.

Course of the Intramolecular Change of Position between Iso- and Tertiary Butyl Bromides and the Catalytic Actions thereby Coming into Play. R. F. BRUNEL. Syracuse Univ. *Ann.*, 384, 245–71; cf. *C. A.*, 5, 2826.—Expts. are carried out with four samples of isobutyl bromide of different m. p. and density values. The cleanliness of the vessels exercizes a considerable influence upon the speed of dissociation. The surface of the liquid phase, if this is present, exerts a strong influence also.
ALVIN S. WHEELER.

Action of Methyl Magnesium Iodide upon *p*-Xylo- and Toluquinone. E. BAMBERGER AND L. BLANGEY. Swiss Federal Polytechnic, Zurich. *Ann.*, 384, 272–322.—The details of the complex procedure necessary is given in 15 tables. Out of the complex product obtained by the action of 21.5 g. Mg and 125. 6 g. MeI upon 120 g. *p*-xyloquinone were isolated the following: 26.4 g. *p*-xylohydroquinone, 2.4 g. pseudocumo-

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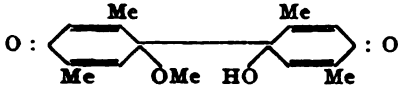
quinol, 5.3 g. pseudocumenol, 1.7 g. *p*- dixyloquinolmonomethyl ether, 5.3 g. dihydrotrimethylquinone, 0.26 g. tetramethyldiketohexamethylene, resins and oils of unknown constitution. *Dixyloquinolmon methyl ether* (I), white silky needles, m.



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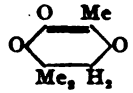
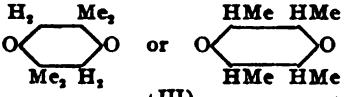


(II)

220–0.5°. *Acetate*, $C_{19}H_{22}O_5$, fine needles, m. 191–2°. *Mono-p-nitrophenylhydrazone*, $C_{22}H_{23}O_5N_3$, golden-yellow glittering crystals, m. 272–2.5°. *Monosemicarbazone*, $C_{13}H_{23}O_4N_3$, satiny leaves, m. 272–3°. *Dihydrotrimethylquinone* (II), columns, 7–8 cm. long from gasolene, or flat needles from H_2O, m. 86°, of strong camphor-like odor, very volatil in steam. *Isomeric p-nitrophenylhydrazones*, brown to orange-red glittering needles with blue metallic luster, m. 306–8°, with decomp. and orange-yellow to orange-brown leaves or needles, m. 244.5–5.5°. *Bis-semicarbazone*, $C_{11}H_{18}O_2N_6$, snow-white crystals, blacken toward 400°. *Tetramethyldiketohexamethylene*, (III),



(III)

colorless prisms, m. 110–1°, of peppermint odor and very volatil in steam. *Bis-semicarbazone*, $C_{12}H_{22}O_2N_6$, needles, m. 330° with decomp. Pseudocumenol and prehnitenol were isolated in pure condition. The action of MeMgI upon toluquinone gave among other products 3,4-xyloquinol. *p-Nitrophenylhydrazone*, $C_{14}H_{13}O_2N_3$, glittering orange-red felted needles, m. 135–5.5°. ALVIN S. WHEELER.

Aromatic Isothiocarbamides and their Conversion into Aromatic *o*-Thiocarbonic Esters. F. ARNDT. Univ. Kiel. *Ann.*, 384, 322–51.—*p-Tolylisothiourea*, $C_7H_7SC(NH)NH_2$, is prepared by the action of 40 g. *p*-thiocresol upon 20 g. cyanamide in 100 cc. Et_2O. The reaction is energetic. Long fine felty needles, m. 110° (decomp.). When heated alone or in EtOH, it is decomposed into the mercaptan and dicyanodiamide. *Dibenzoate*, $C_{22}H_{18}O_2N_2S$, fine needles, m. 122–3°. *Acetate*, large prisms. *Nitrate*, leaves, m. 173°. *Nitrate-sulfate*, $3C_8H_{10}N_2SH_2SO_4HNO_3$, large thin tables. Benzylisothiourea was found to m. 103–4° instead of 71° as given by Bernthsen and Klinger. *Acetate*, hard prisms, much less sol. than the tolyl compd. *Nitrosotolylisothiourea*, $MeC_6H_4SC(NH)NHNO$ or $MeC_6H_4SC(NH)N_2OH$, is obtained from the acetate by the action of HNO_2. Short colorless prisms, m. 112° with vigorous puffing. Cold AcOH causes evolution of N and formation of *p*-tolylsulfocyanide. If the nitroso compd. is heated in MeOH with the addition of aq. NH_3, a N free comp. is obtained, the *tolyl ester* of *orthothiocarbonic acid*, $C(SC_7H_7)_4$, glistening, odorless needles, m. 147°. Digestion of *p*-thiocresol in NaOH with much $CHCl_3$ yields the *tolyl ester* of *orthothioformic acid*, $HC(SC_7H_7)_3$, long leaves, m. 111° with previous softening. The tolyl ester of orthothiocarbonic acid in $CHCl_3$ with Br in $CHCl_3$ gives a *perbromide*, $C(SBrC_7H_7)_4$, dark red leaves m. under 100°, very unstable. It rapidly loses Br, forming a *tetrabromide*, $C(SBrC_7H_7)_4$, fine yellow needles from C_6H_6, m. 169°. If this is b. in EtOH, it gives the *disulfoxide*, $C(SC_7H_7)_2(SOC_7H_7)_2$, needles, m. 92°. *Benzylisothiourea nitrite*, $PhCH_2SC(NH)(NH_2).HNO_2$, needles, m. 126°, with decomp. *Phenyltolylisothiourea*, $MeC_6H_4SC(NH)NHPh$, needles, m. 148°, of weak cocoanut-like odor. *Hydrochloride*, needles. *Nitrate*, small needles, m. 132°. *Benzoate*, $C_{21}H_{18}ON_2S$, leaves, m. 152.5°. *Phenylmethylisothiourea*, $C_{15}H_{16}N_2S$, needles, m. 121°. Carbodiphenylimide and thiocresol give *α,β-diphenyltolylisothiourea*, $MeC_6H_4SC(NPh)$-

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NHPh, hard colorless crystals, m. 119–20°. Phenol and cyanamide do not react analogously. According to Hofmann (*Ber.*, **18**, 3223) phenylcyanamide polymerizes on standing or more quickly when heated to 3-isotriphenylmelamine, m. 185°; this product is in reality a loose addition comp. of 2 mol. triphenylmelamine and 1 mol. phenylcyanamide. ALVIN S. WHEELER.

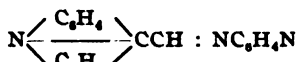
Syntheses from Acetylene and Chlorine. ANON. *Chem. Ztg.*, **35**, 1053.—A résumé of syntheses of technical and synthetical importance. D. BREESE JONES.

Action of Zinc on a Mixture of the Halogen Esters and Anhydrides of Saturated Monobasic Acids. Preliminary Communication. M. ZAITZEV. Org. Lab. Don Polytechn. Inst. *J. Russ. Phys. Chem. Soc.*, **43**, 350–1.—An *acid*, $HO_2C.CMe_2.CH(OH).CMe_2.CO_2H$, was made by the action of Zn and Ac_2O on Et α-isobromobutyrate; m. 152–61°. *Ag salt.* H. M. GORDIN.

Synthesis of Methylethylnonylcarbinol. Preliminary Communication. M. ZAITZEV. Don Polytechn. Inst. *J. Russ. Phys. Chem. Soc.*, **43**, 351–2.—This *carbinol*, $C_{13}H_{28}O$, was made by the action of Mg and EtBr on AcC_9H_{19}; yellowish liquid of peculiar odor, b_{15} 137°. H. M. GORDIN.

Action of Alkyl Halides on Anhydrides of Monobasic Acids in Presence of Magnesium and Zinc. Preliminary Communication. IVAN VANIN. Org. Lab. Don Polytechn. Inst. *J. Russ. Phys. Chem. Soc.*, **43**, 352–3.—*Methylisobutylcarbinol*, $C_6H_{14}O$, was made by the action of iso-BuI on Ac_2O in presence of Mg or Zn; b. 129–31°. A *hydrocarbon*, $C_{12}H_{24}$, is formed in the reaction between iso-AmI, Ac_2O and Mg; b. 189–94°. H. M. GORDIN.

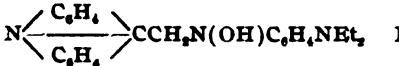
Preparation of Schiff's Bases by means of Nitroso Compounds. A. E. PORAI-KOSHITZ, YU. AUSHKAP AND N. K. AMSLER. Chem. Lab. Technol. Inst., St Petersburg. *J. Russ. Phys. Chem. Soc.*, **43**, 517–25.—According to Sachs (*Ber.*, **35**, 1224) only such substances react with nitroso compds. to form Shiff's bases as contain negative groups in the neighborhood of the reacting Me group. An exam. showed that while, in accord with this rule, quinaldine and *p*-methylquinaldine do not react, meso-methylacridine reacts with *p*-nitrosodimethylaniline and *p*-nitrosodiethylaniline. With the first (I) is formed; red cryst. m. 231-2°; with the 2nd *two compds.* are produced:



(I)

(II)

(II), dark red plates, m. 184°, and (III), orange-yellow needles, m. 208°. If *p*-nitrosodiethylaniline be regarded as a quinoneoxime, $HON : C_6H_4 : N(OH)Et_2$, the constitution of the compd. m. 208° may be as in (IV). When successively treated



(III)

(IV)

with hot dil. acids and Na_2CO_3, the 3 bases give meso-acridylaldehyde, $C_{14}H_9NO$, m. 145–6°. Yield, 87%. *HCl salt*, greenish brown cryst. *Sulfate*, $(C_{14}H_9NO)_2.H_2SO_4$, yellowish green cryst. H. M. GORDIN.

Condensation of Anthraquinone with Phenols. V. V. SHARVIN (with K. A. KUZNETZOV, V. A. NAUMOV, A. L. GANDURIN, N. I. VYEKOV AND S. A. DMITRIEV). Tinctorial Lab. Imper. Techn. School, Moscow. *J. Russ. Phys. Chem. Soc.*, **43**, 562–74.—Continuation of previous work (*Ber.*, **36**, 2020; **37**, 3616). Following new compds. were made: *Tetrabromophenolanthrone*, $C_{20}H_{14}O_2Br_4$, colorless needles, m. 290°; gives yellow soln. in H_2SO_4 changing to reddish violet on heating. *Dinitrophenolanthrone*,

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$H_{20}H_{10}O_7N_2$, greenish yellow plates, m. 236°; gives yellow soln. in alkali becoming more intense on dilu. *Tetranitrophenolanthrone*, $C_{26}H_{14}O_{11}N_4$, lemon-yellow needles, m. 278°; dyes silk and wool yellow. *Hexanitrophenolanthrone*, $C_{26}H_{12}O_{15}N_6$, cryst. *Dinitroresorcinolanthrone*, $C_{22}H_{14}O_8N_2$, yellow powder; dyes silk and wool yellow. *Tetramethoxydiphenylanthrone*, $C_{30}H_{26}O_6$, yellow powder; is saponified to resorcinolanthrone when boiled with $AlCl_3$ in C_6H_6. H. M. GORDIN.

Action of Hydrazine Hydrate on Cyclohexanone. N. KIZHNER AND S. BYELOV. Org. Lab. Technol. Inst. Tomsk. *J. Russ. Phys. Chem. Soc.*, 43, 577–82.—*Cyclohexylidenehydrazine hydrate*, $C_6H_{10} : N.NH_2.H_2O$, was made by the action of a 50% soln. of $(NH_2)_2.H_2O$ on cyclohexanone; colorless liquid b_{22} 107–8°; solidifies to cryst. when mixed with 1 or 2 mols. H_2O; is decomposed by warm dil. HCl into $(CH_2)_5 : CO$ and $(NH_2)_2.HCl$; is reduced by Na + alc. to cyclohexanol and *cyclohexylhydrazine*, $C_6H_{11}NH.NH_2$; m. 46–50; b_{755} 195.5°; gives Ag mirror with an NH_3 soln. of $AgNO_3$; forms a *thioureide*, $PhNH.CS.NH.NH.C_6H_{11}$, (m. 143–5°); gives with pyruvic acid *cyclohexylhydrazone*, $MeC(CO_2H) : N.NH.C_6H_{11}$, (m. 110–2°) and is oxidized to $(CH_2)_6$ by K_3FeCy_6. *Cyclohexylideneazine*, $C_6H_{10} : N.N : C_6H_{10}$, from $(NH_2)_2.H_2O$ and cyclohexanone; m. 33.5–34°; b_{22} 175°; liquid remains supercooled for a long time and has d_0^{20} 0.9847; n_D^{20} 1.5268. *Dicyclohexylhydrazine*, $(C_6H_{11})_2N.NH_2$, from preceding by Na + alc.; b. 220–60; forms *HCl salts*; is supposed to be formed by rearrangement of an intermediate sym. compd. $C_6H_{11}.NH.NHC_6H_{11}$. H. M. GORDIN.

Catalytic Decomposition of Alkylidenehydrazines as a Method of Obtaining Hydrocarbons. N. KIZHNER. Org. Lab. Technol. Inst. Tomsk. *J. Russ. Phys. Chem. Soc.*, 43, 582–95.—When heated with KOH, alkylidenehydrazines decompose into a hydrocarbon and N. It is supposed that a diazo compd. is produced as an intermediate product: $C_nH_{2n-2} : N.NH_2 + KOH \longrightarrow C_nH_{m-1}N(OK)NH_2 \longrightarrow C_nH_{m-1}N : NH + KOH \longrightarrow C_nH_m + N_2 + KOH$. In this way 1,3-methylcyclohexylidenehydrazine gives methylcyclohexane, and thujylidenehydrazine gives thujane. *Camphylidenehydrazine*, $C_{10}H_{18}N_2$ (I), by boiling camphor with $N_2H_4.H_2O$ in alc.; m. 53–5°; b_{22} 143°; $[\alpha]_D = -40.81°$ (in Et_2O); $[\alpha]_D = -32.74°$ (in alc.); combines with H_2O to a liquid hydrate sol. in H_2O; gives an *HCl salt*, $C_{10}H_{18}N_2.HCl$, m. 180°; $[\alpha]_D = -31.33°$ (in H_2O). With excess of HCl (I) is hydrolyzed to camphor and $N_2H_4.2HCl : C_{10}H_{16} : N.NH_2 + 2HCl + H_2O = C_{10}H_{16}O + N_2H_4.2HCl$. If only 1 mol. HCl be taken for 1 mol. of (I), *i. e.*, the HCl salt of (I) be boiled with H_2O, a considerable amt. of camphanazine is produced together with the other products: $C_{10}H_{16} : N.NH_2.HCl + C_{10}H_{16}O = C_{10}H_{16} : N.N : C_{10}H_{16} + H_2O + HCl$. Camphanazine has $[\alpha]_D$ −92.33° (C_6H_6), −90.06° (Et_2O), −37.27° (MeOH), −19.25° (alc.), −14.18° (PrOH). Heated with KOH (I) yields camphane, $C_{10}H_{18}$, m. 158–9°; b_{760} 160–1°; inactive, easily sublimes. **Conversion of Fenchone into Fenchane** (with A. Proskuryakov). By means of $N_2H_4.H_2O$ fenchone was changed to fenchylidenehydrazine and this with KOH gave *fenchane*, $C_{10}H_{18}$ (II), and *fenchaneazine*, $C_{10}H_{16} : N.N : C_{10}H_{16}$ (III). (II) is a mobil liquid of a camphor-like odor, b_{765} 151.5°; d_0^{20} 0.8326; n_D^{20} 1.4463; $[\alpha]_D = -16.53$ (alc.); does not react with Br, HNO_3, HI and $KMnO_4$. (III) m. 106°; $[\alpha] = 212.9°$ (C_6H_6); yields fenchone and $N_2H_4.2HCl$ when heated with conc. HCl. On heating cyclohexylidenehydrazine hydrate with KOH cyclohexane and cyclohexanol are produced: $C_6H_{10} : N.NH_2.H_2O = C_6H_{12} + N_2 + H_2O$; $2C_6H_{10} : N.NH_2.H = 2C_6H_{11}OH + N_2 + N_2H_4$. H. M. GORDIN.

Transformations of Cyclopropyldimethylcarbinol. N. KIZHNER AND V. KLAVIKORDOV. Org. Lab. Technol. Inst. Tomsk. *J. Russ. Phys. Chem. Soc.*, 43, 595–608.—The cyclopropyldimethylcarbinol, $Me_2C(OH)CH\langle^{CH_2}_{CH_2}$ (I), obtained by the

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action of MeMgI on Et trimethylenecarboxylate, contains some unsatd. iodide. When perfectly freed from the iodide by boiling with $Ba(OH)_2$, it b_{748} 124.5–25°; d_0^{20} 0.8844; n_D^{20} 1.433. The compd. obtained by Aleksyeev (*Ibid.*, 37, 417) by the action of Ac_2O on (I) and supposed to be, Me_2C : C<CH$_2$>CH$_2$, is found to be *1,1-cyclopropylmethylethylene*, CH_2 : C(Me)CH<CH$_2$>CH$_2$ (II); b_{772} 71.1–1.5; d_0^{20} 0.7523; n_D^{20} 1.4252. Obtained by Aleksyeev's method it is contaminated by several Ac derivatives. $KMnO_4$ oxidises (II) to *acetyltrimethylene*, C_6H_8O (III), (b_{767} 112–2.5°; d_0^{20} 0.8993; n_D^{20} 1.4244; gives *semicarbazone*, $C_6H_{11}ON_3$, m. 110–2°, which cryst. from H_2O either as $C_6H_{11}ON_3.H_2O$, or as $2C_6H_{11}ON_3.3H_2O$), and a *hydroxy acid*, $CO_2HC(Me)(OH)CH$<CH$_2$>CH$_2$ (IV); colorless needles, m. 75.5°; forms a hydrate, $2C_6H_{10}O_3.H_2O$ which m. 54–5°. In the oxidation of (II) to (IV) an *alcohol*, $HOCH_2C(Me)(OH)CH$<CH$_2$>CH$_2$, which could not be isolated, is supposed to be produced intermediately. Fuming HBr at ordinary temp. changes (IV) to a *bromide*, $C_6H_9O_2Br$ (V), m. 68°, which by heating with the HBr to 100° changes to a *dibromide*, $C_6H_{10}O_2Br_2$, m. 88–90°: $HO_2CC(Me)(OH)CH$<CH$_2$>CH$_2$ ⟶ $CO_2HC(:CH_2)CH_2CH_2Br$ (V) ⟶ $CO_2HCH(CH_2Br)CH_2CH_2CH_2Br$ (VI). On heating (II) with dil. H_2SO_4 to 120° it changes to *hexylene oxide*, $Me_2C.CH_2CH_2CH_2$ (O) (VII), (cf. Zelinskii, *Ber.*, 34, 3887), which is converted by fuming HBr into a *dibromide*, $Me_2CBr.CH_2CH_2CH_2Br$ (VIII); b_{28} 104–4.5°; d_0^{20} 1.5865; n_D^{20} 1.5045. The same dibromide is obtained by the action of HBr on (I). On boiling (VIII) with KOH in alc. it yields *4,4-dimethylbutadiene-2,4*, Me_2 : CHCH : CH_2 (IX); b_{765} 76–7.5°; d_0^{20} 0.7193; n_D^{20} 1.4491, and an *ether*, Me_2C : $CHCH_2CH_2OEt$ (X); b_{765} 142.5–3.5°: d_0^{20} 0.7975; n_D^{20} 1.4182. The constitution of (X) is proved by its giving acetone upon oxidation. By the action of fuming HI (I) changes to a diiodide, $Me_2CI.CH_2CH_2CH_2I$, which upon reduction gives *dimethylpropylmethane*, Me_2PrCH; b_{765} 61–1.5°; d_0^{20} 0.6574; n_D^{20} 1.3735. The constitution (IX) is supported by a consideration of the value of its mol. refraction.

H. M. Gordin.

Oxidation of Unsaturated Compounds with Organic Peroxides. II. Oxidation of Derivatives of Unsaturated Hydrocarbons with One Double Union. N. Prilezhaev. Org. Lab. Warshaw Polytechn. *J. Russ. Phys. Chem. Soc.*, 43, 609–20.—In preparing the peroxides by the author's method (*C. A.*, 4, 916) an 8–10% soln. of the alcoholate should be used. The oxidation of the derivatives of unsatd. hydrocarbons by organic peroxides takes place according to the same scheme as that of the hydrocarbons themselves. Allyl alc., when oxidized with active O in $CHCl_3$ yields the oxide, CH_2(O)$CHCH_2OH$ (I), (cf. Nef, *Ann.*, 335, 191), and a little aldehyde (semicarbazone, m. above 245°). Citronellal gives an *oxide*, $C_{20}H_{18}O_2$ (II); mobil, colorless liquid of aromatic odor; b_{20} 126–7°; d_0^0 0.9437; d_{16}^{16} 0.9344; n_D^{16} 1.4421; $[\alpha]_D$ 9.63°; gives neither an oxime nor a semicarbazone; constitution, either

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Me_2CCHR or $MeC(CH_2R)CH_2$. Treated with H_2O (II) partly polymerizes, partly changes

to a (not abs. pure) *glycol*, $C_{10}H_{20}O_2$ (III); colorless thick liquid; b_{18} 180–2°. Warmed with glacial AcOH (III) gives an *acetyl compd.* $C_{10}H_{19}O_2Ac$; colorless mobil liquid, b_{12} 175–6°; d_0^0 1.0418,; d_4^{16} 1.0295; n_D^{16} 1.4571; behaves like an aldehyde, but gives neither an oxime nor a semicarbazone. *Methylheptenone*, $Me_2C:CHCH_2CH_2CO.Me$, (IV), gives by oxidation an *oxide*, $Me_2CCHCH_2CH_2COMe$ (V); mobil liquid of tur-

pentine-like odor; b_{20} 68–70°; b_{746} 146.5–7.5°; d_0^0 0.987; b_4^{16} 0.9718; $n_D^{16.1}$ 1.43031; is not affected by $KMnO_4$; slightly reduces Fehling's soln.; gives no cryst. oxime or semicarbazone; is easily hydrated to a *glycol*, $Me_2C(OH)CH(OH)CH_2CH_2COMe$ (VI); mobil liquid; b_{12} 139–40°; d_0^0 1.06980; d_4^{16} 1.0582; $n_D^{16.2}$ 1.461, which slowly changes to cryst. m. 65–6°, on standing. Dehydrated by b. with dil. H_2SO_4 (VI) changes to a *diketone*, $Me_2CHCOCH_2CH_2COMe$ (VII); b_{50} 117–9; b_{15} 94–5°; d_0^0 0.9538; d_4^{16} 0.9396; $n_D^{16.2}$ 1.4356; gives a dioxime, m. 131.5–2° and a monosemicarbazone, m. 197–8°. Besides (V) the oxidation of (IV) also yields an *isomeric oxide*, $Me_2CHCHCHCHCH_2$-

COMe (VIII), b_{60} 115–6°; d_0^0 0.9963; d_4^{16} 0.9826; $n_D^{16.3}$ 1.44747; gives on hydration a *glycol*, $Me_2CH.CH(OH)CH(OH)CH_2CO.Me$ (?) isomeric with (VI); b_{14} 143–5°; d_0^0 1.07; d_4^{18} 1.0583; $n_D^{16.2}$ 1.4599; gives upon dehydration the diketone (VII). H. M. G.

Influence of the Masses of the Reacting Substances on the Formation of Oxonium Dibromides in Different Organic Solvents. V. V. CHELINTZEV AND V. K. KONOVALOVA. Univ. Moscow. *J. Russ. Phys. Chem. Soc.*, 43, 620–32.—A calorimetric exam. of the influence of the increasing amt. of one of the reacting substances (Et_2O) on the amt. of Et_2OBr_2 produced showed that for the eight solvents tried (*C. A.*, 5, 2819) the addition of more Et_2O caused only a slight increase in the amt. of the dibromide. The increase differs with the solvent, and is in inverse ratio to the amt. of dibromide formed in equimol. conc. of the Et_2O and the Br. According to the amt. of dibromide formed in presence of 5 mols. Et_2O for one mol. Br, the solvents can be arranged in an increasing series: CS_2, CCl_4, EtBr, BzN, C_6H_6, $CHCl_3$, $C_2H_4Br_2$, PhBr. Comparing this series with the one for equimol. conc., it is seen that, while the nature of the solvents exercizes a decided influence on the yield of dibromide, some of them (EtBr and C_6H_6) may even interchange places when the amt. of one of the reacting substances is increased. H. M. GORDIN.

Influence of the Concentration of the Reacting Substances on the Formation of Oxonium Dibromides in Different Organic Solvents. V. V. CHELINTZEV AND V. K. KONOVALOVA. Univ. Moscow. *J. Russ. Phys. Chem. Soc.*, 43, 633–50.—A table is given for the amts. of Et_2OBr_2 formed in different solvents (preced. abst.) in conc. of 2.5 *N*, 1.5 *N* and 0.9 *N* of Et_2O and Br. In all cases diln. causes a drop in the yield of dibromide. In CS_2 and CCl_4 the amt. of dibromide is almost proportional to the conc., while with the other solvents the change in the yield is greater than that of the conc. The special influence of the individual solvents does not vanish with increasing diln., but the order of arrangement of the solvents according to their retarding effect upon the yield changes materially with diln. Arranging the solvents according to the amts. of $EtOBr_2$ formed in equal conc., we get for the 3 concs. the following ascending series: (1) 2.5 *N*, CS_2, CCl_4, EtBr, BzN, $C_2H_4Br_2$, $CHCl_3$ C_6H_6, PhBr. (2) 1.5 *N*, $C_2H_4Br_2$, EtBr, CS_2, C_6H_6,CCl_4, $CHCl_3$, PhBr, BzN. (3) 0.9 *N*, $C_2H_4Br_2$, EtBr, C_6H_6, CS_2, CCl_4, PhBr, BzN, $CHCl_3$. A further calorimetric exam. of the relative

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changes in conc. and the yields of dibromide showed that in all cases there are three regions of changes: In low conc. the retarding influence of diln. is greater than the chem. forces producing the reaction; in medium conc. the 2 factors compensate each other, while in high conc. the chem. forces preponderate to such an extent that the retarding influence of the solvent only becomes noticeable near the end of the reaction when the conc. of the reacting substances diminishes. With respect to the positions of these regions the above solvents can be arranged in the following ascending series: CS_2, CCl_4, EtBr, $C_2H_4Br_2$, C_6H_6, BzN, $CHCl_3$, PhBr. H. M. GORDIN.

Reduction of Potassium Cyanate with Hydrogen. A. LIDOV. *J. Russ. Phys. Chem. Soc.*, 43, 650–1.—On passing dry H over KCNO at 400° the latter is reduced to KCN. The reaction is evidently complicated, since the amt. of KCN from a given amt. of KCNO is not const. and the loss in wt. of the KCNO is frequently greater than the amt. of H_2O produced. H. M. GORDIN.

Formation of Cyanates from Nitrites. A. P. LIDOV. *J. Russ. Phys. Chem. Soc.*, 43, 651–2.—On introducing in small portions a mixt. of $NaNO_2$ with 3–5 times the calc. amt. of C into a heated Pt vessel, an energetic reaction takes place, and the soln. obtained by dissolving the residue in H_2O no longer evolves NO when shaken with Hg and H_2SO_4. The soln. decomposes on standing, evolving NH_3 and showing the presence of Na_2CO_3, NaCNO, NaCN and some other cyanogen acids. One of these gives a Ba salt which is sol. in neutral solns., but is deposited in shining scales upon addition of alkali. Freshly prepared and dried this salt does not evolve gas with acids, but on keeping it darkens, and then evolves with acids a "carbon acid" gas, the wt. of which from a given amt. of the Ba salt (?) is, however, less than that of CO_2. H. M. GORDIN.

Oxidation of Sodium Cyanamide and Cyanates with Hydrogen Peroxide and Alkaline Bromine Solutions. A. P. LIDOV. *J. Russ Phys. Chem. Soc.*, 43, 652–3.—On adding a soln. of Br in NaOH (free from CO_2) to a soln. of Na cyanamide only 15–25% N is obtained. Decomp. of the alk. liquid with H_3PO_4 yields "carbon acid" gas (preced. abst.). On oxidizing Na cyanide with hot H_2O_2 and pptg. the soln. with $Pb(OAc)_2$ an insol. white Pb salt is obtained which yields the same "carbon acid" gas. 12 g. of the salt gave 1.902 g. gas. The same gas was also obtained from the Ba salt made by adding $BaCl_2$ to the product of oxidation of KCNO with an alk. Br soln. The gas is supposed to be oxane, CNO (?). H. M. GORDIN.

Propylamine Peroxide. Preliminary Communication. E. K. KUROVSKII AND L. NISEMNAN. Lab. Univ., New Russia. *J. Russ. Phys. Chem. Soc.*, 43, 654–5.—*Propylamine peroxide*, $PrNH_2.OOH$, was made from $PrNH_2$ and H_2O_2 at very low temp.; thick oil solidifying to cryst. mass when cooled with CO_2 + Et_2O. It could not be analyzed, but the formula was detd. by the relation of the active O to the $PrNH_2$. H. M. GORDIN.

Conversion of Glycocoll into Diglycolamidic and Triglycolamidic Acids. M. SIEGFRIED. Chem. Abt. physiol. Inst., Univ. Leipzig. *Z. physiol. Chem.*, 73, 194-203.—The interaction of $HgCl_2$ and glycocoll in aq. soln. at 40° may produce not only diglycolamidic (see *C. A.*, 5, 2247) but also triglycolamidic acid, $C_6H_9O_6N$. The latter is pptd. by $AgNO_3$ + NH_3, after the product has been freed from Hg and Cl. Colorless crystals from hot H_2O; decomp. 258–9°; yield 5.7%. Silver salt, $C_6H_8O_6NAg_3$. No similar reaction takes place between alanine and $HgCl_2$. A. HUNTER.

Optically Active Modifications of Lactic Acid. R. O. HERZOG AND P. SLANSKY. Chem. Inst. techn. Hochsch., Karlsruhe. *Z. physiol. Chem.*, 73, 240–6.—Optically active lactic acid heated to 120° in alk., neutral, or acid soln. is racemized, if at all,

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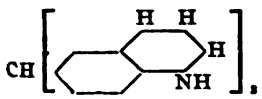
with extreme slowness. In spite of the statement of Jungfleisch (cf. *Compt. rend.*, 139, 56 and 203) the 2 antipodes exhibited no difference in this respect. A. H.

Glycocholic and Paraglycocholic Acids. E. LETSCHE. Physiol. chem. Inst., Univ. Tübingen. *Z. physiol. Chem.*, 73, 308–11.—Glycocholic acid contains, as stated by Knoop (see *Biochem. Handlexikon*, 3, 312), 1.5 mols. H_2O; m. 126–30° (decomp.); when anhydrous m. 130–55° (decomp.). Paraglycocholic acid contains 1 mol. H_2O; m. 186–98° (decomp.); when anhydrous it m. 193–8°. (decomp.). The latter is not merely the anhydrous form of the former. A. HUNTER.

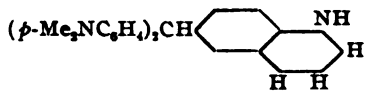
Ionogenic Atomic Groups and Atoms. O. HINSBERG. Freiburg i. B. *J. prakt. Chem.*, 84, 169–93.—H. discusses the sp. effect of unsatd. groups such as $=C=O$ on the acidity or basicity of the mol. Such groups he terms "ionogens." An ionogen of the 1st. order exerts a sp. action on the H in the α-position, as, *e. g.*, in HCl; an ionogen of the 2nd. order affects the H in the β-position, as, *e. g.*, in PhC(:O)OH, an ionogen of the 3rd. order affects the H in the γ-position. Other groups or atoms only exert a strengthening or weakening action without being able to cause ion formation. Such groups or atoms are called "kommutierenden". The effect of several ionogens is discussed, illustrating the application of H.'s reasoning. *Dibenzaldithiodiglycolic acid*, $[PhCH:C(CO_2H)]_2S$ was prepd. from Et thiodiglycolate and BzH; colorless needles, m. 228–30° (with decomp.), sol. in H_2O and H_2SO_4. The latter soln. is first yellow, then yellowish red. Addition of H_2O ppts. acid of unknown comp. GEORGE W. MOREY.

Volatility of Sulfur Compounds. MARCEL DELÉPINE *Compt. rend.*, 153, 725–7.—From the data at hand, this generalization may be drawn: The substitution of S for O raises the b. p. of compds., except when the substitution occurs in the OH radical of H_2O and the lower alcs., phenols and acids. This is in harmony with Henry's observations (*C. A.*, 3, 1012). CHAS. A. ROUILLER.

Hydrogenated Triquinoylmethane and the Influence of Quinolic and Tetrahydroquinolic Groups on the Character of Dyes of the Malachite Green Series, in Accordance with Bamberger's Theory. E. SCHELL. *Rev. gén. mat. color.*, 15, 259–65.—*Tri(tetrahydroquinoyl)methane.* (I), from triquinoylmethane and Sn in HCl, cryst.



(I)



(II)

magma, softens 80°, m. slightly higher. PbO_2 in AcOH or chloroanil in Et_2O oxidizes it to a beautiful violet-blue dye sepg. from Et_2O in coppery scales and having all the properties of basic triphenylmethane dyes. When cautiously heated above its m. p., the leuco base passes through a green stage, evidently due to the splitting off of 4 H ats. and passage through the octohydro deriv., which should give a dye of the malachite green series. *p-Nitrotetramethyldiaminotriphenylmethane*, $O_2NC_6H_4CH(C_6H_4NMe_2)_2$, from $O_2NC_6H_4CHO$ and $PhNMe_2$ in alc. in the presence of $ZnCl_2$, yellow lamellas, m. 177°; Zn and HCl reduce it to *tetramethyl-p-triaminotriphenylmethane*, m. 152°, which, when heated with picric acid, glycerol and conc. H_2SO_4 at 130–60° for 3–4 hrs., gives *tetramethyldiaminodiphenyl-p-quinoylmethane*, m. 164°. With PbO_2 or chloroanil, this forms a green dye, and is reduced by Sn and HCl to *tetramethyldiaminodiphenyl-p-tetrahydroquinoylmethane* (II), m. 159–60°, assumes bluish tint in the air, and gives a pure blue dye with oxidizers. *Tetramethyldiaminodiphenyl-m-tetrahydroquinoylmethane* (III), obtained like the *p*-compd. by starting with m-$O_2NC_6H_4CHO$, m. 179–80°. *Tetramethyldiaminodiphenyl-m-quinoylmethane*, m. 185–6°. Both this and the tetrahydro compd. form green basic dyes with oxi-

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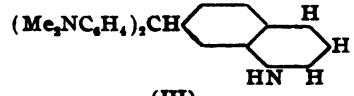
dizers. All the above facts are in harmony with Bamberger's rules on the hydrogenation of naphthalene derivs. and tetrahydroquinoline behaves like a monoalkylaniline.



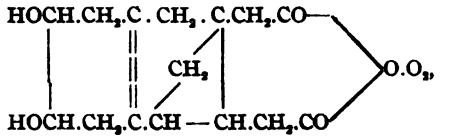
(III)

A further confirmation is afforded by the fact that the compd. (II) is obtained directly by the condensation of $(Me_2NC_6H_4)_2CHOH$ with tetrahydroquinoline in HCl. In the prep. of "quinoline green" (Badische Anilin u. Soda Fabrik, Ger. patent 27,789; *Friedlander*, 1, 84), a mixt. of the *p*-quinoylmethane, m. 164°, described above, and a blue dye, sol. in $CHCl_3$, were obtained. The latter could not be obtained in cryst. form. CHAS. A. ROUILLER.

Crystallographic Investigation of Inactive Ornithine Monopicrate. P. REINER. Heidelberg. *Z. physiol. Chem.*, 73, 192–3.—Kossel and Weiss' salt, $C_5H_{12}O_2N_2.C_6H_3(NO_2)_3$ (*C. A.*, 5, 1787), forms triclinic crystals, $a : b : c = 0.6962 \pm 0.0001 : 1 : 0.6301 \pm 0.0008$, α 93° 10′ ± 2′, β 100° 55′ ± 2′, γ 81° 19′ ± 12′, *a*(100), *b*(010), *c*(001), *m*(110), *μ*(1$\bar{1}$0), *x*(0$\bar{1}$1), *o*(1$\bar{1}$1), good cleavage along (100), (110) and (011), distinct pleochroism (orange-yellow, S-yellow and greenish yellow). C. A. R.

Behavior of some Nitroazo Derivatives towards Phenylhydrazine. C. GASTALDI. Ist. chim. farm. tossic. r. univ. Sassari. *Gazz. chim. ital.*, 41, II, 319–24.—The following compds. were prepared by Ponzio and Charrier's method (*C. A.*, 5, 686). *o-Nitrobenzoylazophenyl*, PhN : $NCOC_6H_4NO_2$, red needles, m. 89°. *m-Nitrobenzoylazophenyl*, dark red laminas, m. 117°; the $PhNHNHCOC_6H_4NO_2$ from which it is made m. 158°, not 205° as given by Autenrieth (*Ber.*, 34, 185). *p-Nitrobenzoylazophenyl*, red laminas, m. 136°. *o-Nitrobenzoylazo-p-bromophenyl*, m. 119–20° (somewhat impure), prepared from *o-nitrobenzoyl-p-bromophenylhydrazine*, needles, m. 193°. *m-Nitrobenzoylazo-p-bromophenyl*, bronze-colored laminas, m. 124°, from *m-nitrobenzoyl-p-bromophenylhydrazine*, light yellow needles, m. 198°. *p-Nitrobenzoylazo-p-bromophenyl*, bronze-colored laminas, m. 153°, from *p-nitrobenzoyl-p-bromophenylhydrazine*, yellow needles, m. 194°. $PhNHNH_2$ reduces these compds. in alc. to the original hydrazines CHAS. A. ROUILLER.

Picrotoxin. F. ANGELICO. Lab. chim. farm. r. univ. Palermo. *Gazz. chim. ital.*, 41, II, 337–49; cf. *C. A.*, 4, 2457; 5, 1092.—Both picrotin and picrotoxin react in the same way with HI and red P, and from the complex reaction product were isolated the acid $C_{15}H_{18}O_4$ and the ketone $C_{14}H_{16}O_2$, previously obtained in the same way from *α*-picrotinic acid. All the facts thus far known indicate that the structure of picrotin may be represented by the formula



the position of the 2 OH groups being as yet uncertain and the nature of 2 O ats. unknown. The latter are neither hydroxylic, aldehydic or ketonic; the most likely assumption is that they form an oxymethylene bridge within one of the rings. Attempts to det. their nature by the action of PCl_5 on the various products obtained from picrotin were unsatisfactory. The acid $C_{15}H_{18}O_4$ is practically unchanged even at 150°, the ketone $C_{14}H_{16}O_2Cl$ forms an oily ketone giving a very unstable hydrazone and another ketone, $C_{29}H_{36}O_2Cl_2$, m. 168–9°, which, on dry distillation with Zn powder, yields traces

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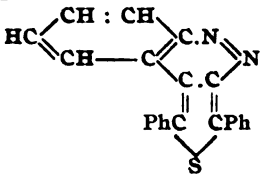
of a *hydrocarbon* whose *picrate* m. 205–6°. The same products are obtained from the ketone $C_{14}H_{16}O_3$. In the oxidation of the acid $C_{13}H_{18}O_4$, besides the acids already described is obtained, in small amt., another *acid*, $C_{14}H_{16}O_6$, needles, m. 180°. The acid $C_{12}H_{12}O_7$, when treated with CrO_3 in 25% H_2SO_4 (3 ats. O), gives a dibasic *acid*, $C_{12}H_{12}O_7$, needles, m. 289–90° (decomp.), very sensitive to oxidizing agents. *Disilver salt*, minute needles. The nitro acid $C_{12}H_{15}O_5N$ is reduced by $(NH_4)_2S$ to the corresponding *amino acid* $C_{12}H_{17}O_3N.H_2O$, long needles, m. 175–6°, which is oxidized by cold $KMnO_4$ to a tribasic *acid*, $C_7H_{10}O_6$, minute needles, m. 95°. *Trisilver salt.*

CHAS. A. ROUILLER.

Azinetriphenylpyrrole. F. ANGELICO. Lab. chim. farm. r. univ. Palermo. *Gazz. chim. ital.*, 41, II, 378–81; cf. *C. A.*, 4, 1618; 5, 1092.—In the prep. of the dithio ketone $C_{22}H_{16}N_2S_2$ by the action of $(NH_4)_2S$ on the corresponding diketone, a small amt. of the *thiophene compound*



is obtained from the mother liquors in cedar-yellow needles, m. 151°; a few drops of HNO_3 convert it back into the diketone. Both the diketone and the dithio ketone behave in the same way towards NH_2OH; the chief product is a *compound*, $C_{44}H_{27}O_2N_5$, golden-yellow needles, m. 205–6°, sol. in AcOH with intense blue color. This confirms the view that the 2 compds. have analogous structures. C. A. R.

Addition Products of Trinitrobenzene Derivatives with some Nitrogenous Aromatic Substances. R. CIUSA AND L. VECCHIOTTI. Ist. chim. gen. r. univ. Bologna. *Atti accad. Lincei*, 20, II, 377–83; cf. *Ibid.*, 16, I, 418; *C. A.*, 5, 3405.—Hydrazones add 2 mols. picryl chloride unless a NO_2 group is introduced into the aldehyde residue; a NO_2 group in the PhNHNH- residue has not always the same influence. Of the methylphenylhydrazones, that of BzH adds 2, that of piperonal 1 mol. of picryl chloride. Only PhCH : NNHPh, PhCH : CHCH : NNHPh and *p*-MeC_6H_4NHN : CHPh add 2 mols. of other trinitrobenzene derivs.; all other hydrazones add but 1. It would seem that one mol. of the trinitrobenzene deriv. adds to the aldehyde benzene residue, the 2nd to the secondary N of the hydrazone (tertiary, in the case of alkylphenyl- or diphenylhydrazones). The following addition products have not been described: *p*-$O_2NC_6H_4$-NHN : $CHPh.2C_6H_2(NO_2)_3Cl$, carmine-red needles, m. 132°. PhCH : NNMePh.-$2C_6H_2(NO_2)_3Cl$, dark red needles, m. 65°. PhCH : CHCH : $NNHPh.2C_6H_2(NO_2)_3Cl$, m. 122–3°. *m*-$O_2NC_6H_4CH$: $NNHPh.C_6H_2(NO_2)_3Cl$, dark red needles, m. 98°. $CH_2O_2C_6H_3CH$: $NNMePh.C_6H_2(NO_2)_3Cl$, black needles with violet luster, m. 115°. PhCH : $NNHPh.2C_6H_3(NO_2)_3$, dark red needles, m. 134°. PhCH : $NNHPh.2C_6H_2$-$(NO_2)_3Me$, flattened, dark red needles, m. 84°. PhCH : $NNHPh.2C_6H_2(NO_2)_3OH$, violet-black needles, m. 117°. *o*-$O_2NC_6H_4CH$: $NNHPh.C_6H_3(NO_2)_3$, dark red needles, m. 132°. *p*-MeC_6H_4NHN : $CHPh.2C_6H_2(NO_2)_3$, gleaming, black scales, m. 142°. PhCH : CHCH : $NNHPh.2C_6H_3(NO_2)_3$, red-brown needles, m. 167°. *m*-$O_2NC_6H_4CH$:-$NNHPh.C_6H_3(NO_2)_3$, dark red needles, m. 136°. *m*-$O_2NC_6H_4CH$: $NNHPh.C_6H_2(NO_2)_3$-Me, red needles, m. 105–6°. *p*-$O_2NC_6H_4CH$: $NNHPh.C_6H_3(NO_2)_3$, gleaming, dark red scales, m. 144°. *p*-$MeOC_6H_4CH$: $NNHPh.C_6H_3(NO_2)_3$, red-brown needles, m. 113°. $CH_2O_2C_6H_3CH$: $NNHPh.C_6H_3(NO_2)_3$, almost black needles with violet luster, m. 147°. *p*-$O_2NC_6H_4NHN$: $CHPh.C_6H_3(NO_2)_3$, red needles, m. 164–5°. The addition products of PhCH : NNMePh, $CH_2O_2C_6H_3CH$: NNMePh and *m*-$O_2NC_6H_4CH$:-

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NNMePh with $C_6H_3(NO_2)_3OH$ and of the last hydrazone with $C_6H_2(NO_2)_2Cl$ were also prepared; they are all very unstable. C. A. R.

Essence of Santolina chamaecyparissus. III. L. Francesconi and P. Scarafia. Ist. chim. gen. r. univ. Cagliari. *Atti accad. Lincei*, 20, II, 383–7; cf. *C. A.*, 6, 230.—The facts so far known indicate that the ketone $C_{10}H_{16}O$ has the structure of $\Delta^{1,6}$-menthene-2-one, $\begin{matrix} CH_2.C(:CH_2)-CO \\ | \qquad\qquad | \\ CH_2.CH(CHMe_2).CH_2 \end{matrix}$, although the properties of its derivs. do not coincide with those of derivs. of any known ketone of this constitution; possibly the ketone is a stereoisomer of those already known. C. A. R.

Action of Nitrosyl Chloride on the Essence of Bupleurum fruticosum. Nitrosochlorides. Derivatives and Decomposition Products. Dihydrocuminal. III. L. Francesconi and E. Sernagiotto. *Atti accad. Lincei*, 20, II, 388–92; cf. *C. A.*, 6, 231.—The nitrosochloride obtained from the essence, when b. with H_2O or $(CO_2H)_2$, loses part of its Cl and then m. 90–2°. B. Na_2CO_3 slowly changes it into a red-brown paste. AcOH (25%) on the H_2O bath decomp. it violently, giving much gas, chiefly HCl; a red, friable substance, m. 68°, containing 70.47% C, 9.42 H and 7.65 N; and a yellow oil somewhat lighter than H_2O, n 1.5075, which instantly forms, with 40% $NaHSO_3$ containing a little alc., a white addition product, while H_2O ppts. from the filtrate an oil lighter than H_2O, n 1.4836, which does not react with $NaHSO_3$ or NH_2CONH_2. The $NaHSO_3$ compd., when decomp. with Na_2CO_3, yields an *aldehyde* d_{18} 0.9825, n 1.5280–1.5305, d-rotatory, b_{15} 136–40°, which has the comp. $C_{10}H_{16}O$. *Semicarbazone*, silvery laminas, m. 197–8°, turns yellow in the light. *Aldazine*, $(C_{10}H_{14}N)_2$, yellow laminas, m. 111–2°. *Phenylhydrazone*, long needles, m. 123–6°. *p-Bromophenylhydrazone*, pale yellow, polyhedral laminas, m. 127–9°. The 2 hydrazones and the semicarbazone are phototropic, becoming red in sunlight. All these derivs. are d-rotatory. Ag_2O in alc. oxidizes the aldehyde to cuminic acid; the former must, therefore, be a dihydrocuminaldehyde. C. A. R.

Crystallin Alkaloid of Calycanthus glucus. H. M. Gordin. Northwestern Univ., School of Pharmacy. *J. Am. Chem. Soc.*, 33, 1626–32; cf. *C. A.*, 4, 908.—$C_{11}H_{14}N_2$·0.5 H_2O and MeI under various conditions of conc., temp. and pressure yield about 35% isocalycanthine hydroiodide and 30% *quaternary iodide*, $C_{24}H_{28}N_2IO_2H_2O$, white, glittering needles from MeOH, turns brown 213–4°, m. above 325°. $[\alpha]_D^{23.6} = 189.95°$. *Hydroiodide of the quaternary iodide*, $C_{24}H_{28}N_2IO.HI.H_2O$, silky needles turn brown but does not melt at 325°. On shaking the quaternary iodide with AgCl and dil. HCl it yields *quaternary chloride*, $C_{24}H_{28}N_2ClO.3H_2O$, white, flat needles from MeOH, darken 214°, m. 220°, $[\alpha]_D^{24}$ 246.76. *Hydrochloride*, $C_{24}H_{28}N_2ClO.HCl$, yellow microscopic needles from MeOH, not m. at 250°. *Quaternary nitrate* was prepared by adding KNO_3 to the chloride in H_2O, white rectangular prisms from H_2O, m. 192–4° to a reddish liquid. *Quaternary picrate*, soft, orange-yellow plates, m. 155°. *Quaternary picrolonate*, bright orange microscopic needles from H_2O, m. 164–6°. Stuart J. Bates.

Velocity of the Ring Opening in Connection with the Composition of the Unsaturated Ring Systems. J. Boeseken and A. Schweizer. Org. Chem. Lab. Technical Univ., Delf. *Proc. Akad. Wetenschappen* (English), 13, 534–6.—The rate of hydration of maleic and succinic anhydrides was measured in a manner similar to that described by Rivett and Sidgwick (*C. A.*, 4, 2900). At 25° that for maleic anhydride is too great to be measured, at 0° it is 14.2 times as fast as that of succinic anhydride. The hydration is a unimolecular reaction. S. J. B.

Chloroiminoquinones. L. C. Raiford. *Am. Chem. J.*, 46, 417–56.—2-Bromo-4-nitrophenol (*a*) was prepared from its Ba salt by treatment with HCl, colorless needles from H_2O, m. 112°. 2-Bromo-4-aminophenol hydrochloride (*b*) was prep. by the

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action of conc. HCl upon (*a*) in presence of $SnCl_2$. Yellowish crystals decomp. without m. 225°. By treatment of (*b*) with $(NH_4)_2CO_3$, 2-bromo-4-aminophenol, brownish needles from C_6H_6, m. 165°, is formed. At 0°, *4-chloroimino-2-bromoquinone* (I), $O : C_6H_2Br : NCl$, is formed by treatment of (*b*) with an HCl soln. of NaClO, crystals from ligroin, decomp. without m. 60°. *4-Chloroimino-2-chloro-6-bromoquinone* (II), $O : C_6H_2BrCl : NCl$ was prepared as (I) from the phenol, m. 137°, and the hydrochloride decomp. 225°, crystals from ligroin, m. 87–8°, decomp. 175°. *2,4,6-Trichloro-3-methylphenyl acetate*, $C_9H_7O_2Cl_3$, sepd. as an oil, distilling at 273–4° from the action of Ac_2O in presence of Na acetate, upon trichloro-*m*-cresol, 2,6-dichlorotoluquinone (*c*) was prepared by oxidizing the *m*-cresol. Yield, 72% crystals from ligroin and alc., m. 103°. A satd. soln. of SO_2 acting upon (*c*) produced 2,6-dichlorotoluhydroquinone, colorless needles, m. 171°. On nitration with $NaNO_2$ of tribromo-*m*-cresol, a mixture of isomeric mononitrodibromo-*m*-cresols, m. 113°, sepd. as a yellow solid. The *p*-compd. (*d*) 2,6-dibromo-4-nitro-*m*-cresol pptd. from ligroin, m. 134°. *o*-Compd. (*e*) 2,4-dibromo-6-nitro-*m*-cresol was obtained on evap. of ligroin filtrate and cryst. from alc., m. 87°. The aminocresol hydrochloride was obtained from (*d*) as (*b*), decomp. 225°. The aminocresol of (*d*) from alc., m. 176°, *2,6-dibromo-4-benzoylamino-m-cresol*, $C_{14}H_{11}O_2NBr_2$, was obtained by treating the aminocresol with BzCl, crystals from $CHCl_3$ and ligroin, m. 198°. *3,5-Dibromo-6-methyl-p-hydroxyphenylurethan*, $HOC_6HBr_2MeNHCO_2Et$, was obtained by treating the aminocresol of (*d*) with $EtCO_2Cl$ and HCl. Crystals from $CHCl_3$ and ligroin, m. 155°. *4-Chloramino-2,6-dibromotoluquinone* (III), $O : C_6HBr_2Me : NCl$, was obtained as (I), m. 86°. The aminocresol hydrochloride of (*e*), prepared as (*b*) from (*e*) was less sol. in H_2O than *p*-compd. The aminocresol of (*e*) m. 116–7°. The *benzoate of* (*e*) was prep. as benzoate of (*d*), m. 188°. *Urethan of* (*e*) prep. as urethan of (*d*), yield 60%. Crystals, m. 169°. The *aminophenyl acetate of* (*e*) from cresol of (*e*). Colorless, silky needles from alc., m. 216°. *2,4-Dibromo-3-methyl-6-nitrophenylethyl carbonate*, $O_2NC_6HBr_2MeOCO_2Et$, was prepd. in presence of NaOH by treatment of (*e*) with $EtCO_2Cl$. The oil solidified from glacial AcOH, m. 43–5°. By reduction of the carbonate with Sn and HCl, the urethan m. 169°, was prepared (IV). Three chloroiminochlorotoluquinones were prepared as (I): 6-Chloroimino-4-chlorotoluquinol, m. 91°, obtained from Kehrmann's chloroaminocresol; *6-chloroimino-2-chlorotoluquinone*, $O : C_6H_2ClMe : NCl$, m. 87°, obtained from chloroaminocresol; *4-chloroimino-2-methyl-5-chloroquinone*, m. 65°, obtained from 2-methyl-4-amino-5-chloro-*o*-cresol. *2-Chloro-4-benzoylamino-5-methylphenyl benzoate* was prepd. from the aminocresol, m. 206–7°, as benzoate of (*d*), m. 220°. *3-Chloroimino-4-chlorotoluquinone*, $O : C_6H_2ClMe : NCl$, was obtained as (I) from 3-nitro-4-chlorotoluene, crystals from ligroin, m. 65°. *2-Chloro-6-nitro-m-cresol*, $HO.C_6H_2ClMeNO_2$, was obtained by chlorinating 6-nitro-*m*-cresol, crystals from benzene, m. 133°. *Hydrochloride of* (*f*) prep. as (*b*), m. 250°. *Aminocresol of* (*f*) prep. as (*c*), m. 166–7°. The acetate of (*f*) m. 178°. *2-Chlorotoluhydroquinone* (V), $O : C_6H_2ClMe : O$, was obtained by treatment of aminocresol of (*f*) with cold dichromate mixture. Crystals, m. 55°. *2-Chlorotoluhydroquinone*, $HOC_6H_2ClMeOH$, was obtained by treatment of (V) with satd. soln. of SO_2, colorless leaflets from H_2O, m. 173°. On passing Cl (1 mol.) into dry 2-nitrotoluene a mixt. of isomers 6-chloro-2-nitrotoluene and 4-chloro-2-nitrotoluene b. 236–7° are formed. The mixt. was reduced by Sn and HCl to the toluidine and by glacial AcOH to the acetotoluide. On crystn. 6-chloro-2-nitroacetotoluidine was formed, m. 154°, and 4-chloro-2-nitroacetotoluidino, m. 136–7°. The mixture of the nitrotoluenes by elec. reduction and rearrangement in H_2SO_4 produced the corresponding pair of phenols: 1-Methyl-2-chloro-6-aminophenol and 1-methyl-4-chloro-6-aminophenol which in turn, by oxidation, give *p*-chlorotoluquinone, m. 105° and *o*-chlorotoluquinone, m. 55°.

T. E. Layng.

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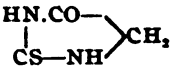
Hydantoins. CXCIV. The Action of Acylthioncarbamates, Acyldithiocarbamates and Acylamidodithiocarbonates on α-Amino Acids. 2-Thiohydantion. H. L. WHEELER, B. H. NICOLET AND T. B. JOHNSON. Sheffield Lab., Yale Univ. *Am. Chem. J.*, **46**, 456–74.—*Ethyl benzoylpseudoethylhydantoate*, BzN : $C(OEt)NHCH_2COEt$, was produced by reaction of Et aminoacetate and Et benzoylthioncarbamate. Yield, 65–70%. Crystals from alc., m. 79–80°. The *methyl hydantoate*, colorless prisms, m. 103° was produced similarly. (*a*) *Benzoylpseudoethylhydantoic acid*, BzN : $C(OEt)NHCH_2CO_2H$, was produced from the reaction of aminoacetic acid and Et benzoylthioncarbamate in presence of KOH, crystals from alc., m. 161°, became clear oil 203°. By hydrolysis of (*a*) or its Et ester with HCl (*b*) *benzoylhydantoic acid*, $BzNHCONHCH_2CO_2H$, is formed. Yield, 60%, plates, m. 253–4°. Conc. HCl converted (*b*) into benzoic acid and hydantoin. Unsuccessful attempts were made to condense (*b*) into benzaldehyde. *Ethyl benzoylthiohydantoate*, $BzNHCSNHCH_2CO_2Et$, was produced by mixing Et benzoyldithiocarbamate and Et aminoacetate, needles from alc., m. 128–9°. (*c*) *Benzoylthiohydantoic acid* was produced by acting on the dithiocarbamate in a manner similar to (*a*), needles from alc., m. 202°. By digesting (*c*) or acetylthiohydantoic acid or its ethyl ester with HCl, 2-thiohydantoin (I), yellow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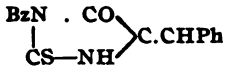
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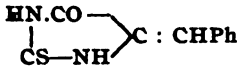
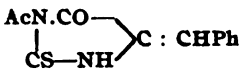

(III)

prisms from alc., m. 227°, are formed. By condensation of (*c*) with benzaldehyde in presence of Na acetate and acetic anhydride, 1-benzoyl-4-benzalthiohydantoin (II), rectangular plates from alc., m. 181°, decomp. 260° was formed. 4-Benzalthiohydantoin (III) was produced by treating (II) with $EtCO_2H$ in presence of KOH, yellow needles from alc., m. 258°. *Ethyl benzoylpseudoethylthiohydantoate*, BzN : $C(SEt)NHCH_2CO_2Et$, was produced by action of Et aminoacetate on diethyl benzoyliminodithiocarbonate, flakes from alc., m. 77–8°. From aminoacetic acid and the dithiocarbonate, *benzoylpseudoethylthiohydantoic acid* was prepared. Yield, 65% colorless needles from alc., m. 198°. From aminoacetic acid and Et acdithiocarbamate (*d*) acetylthiohydantoic acid, $AcNHCSNHCH_2CO_2H$, m. 205°, was prepared. When (*d*) is heated with conc. HCl it is converted into thiohydantoin. By condensation of (*d*) in presence of Na acetate and acetic anhydride, 1-acetyl-2-thio-4-benzalhydantoin (IV) is formed. Yellow prisms from alc., m. 231°. From Et amino acetate and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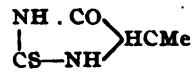
(V)

Et acdithiocarbamate, ethyl acetylthiohydantoate was prepared, prisms from alc., m. 104–5°. From alamino and Et acdithiocarbamate (*e*) *1-acetyl-4-methylthiohydantoic acid*, m. 121°, was prepared. When (*e*) is treated with conc. HCl, *2-thio-4-methylhydantoin* (V) is produced, flat prisms from alc., m. 158–9°. T. E. LAYNG.

Benzimineazoles, Benzoxazoles and their Azo-Dye Derivatives. O. KYM. Univ. Lab., Zurich. *Ber.*, **44**, 2919–32.—*N,N'-Bis-p-nitrobenzoyl-2-nitrophenylene-1,4-diamine*, $O_2NC_6H_3(NHCOC_6H_4NO_2)_2$, is prepared from *p*-nitrobenzoyl chloride and 2-nitrophenylene-1,4-diamine, at 240–60°, during 1.5 hrs., or from *p*-nitrobenzoyl chloride and *N,N'*-bis-acetyl-2-nitrophenylene-1,4-diamine, at 250°, during 15 mins.; golden lustrous plates from pyridine + alc., m. above 305°. Yield, 25% and 114% of the di-Ac deriv., resp. Fuming HNO_3, at the ordinary temp., converts it into *N,N'-bis-p-nitrobenzoyl-2,3-dinitrophenylene-1,4-diamine*, $(O_2N)_2C_6H_2(NHCOC_6H_4NO_2)_2$, which is also formed from *p*-nitrobenzoyl chloride and *N,N'*-bis-acetyl-2,3-dinitrophenylene-

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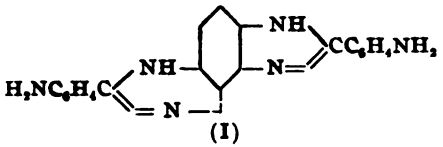
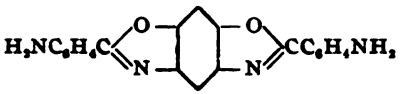
,4-diamine, at 150–200°, during 0.5 hr.; pale yellow needles from acetone + H_2O, m. 262°. When heated with Sn and conc. HCl it is reduced to *p,p'-diaminodi-α-phenylbenzdiimineazole*, formula (I) below; the reaction proceeds most easily with



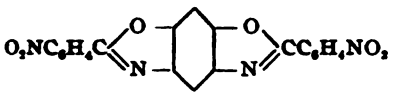
(I)

nitro compd. which has been recently pptd. from aq. NaOH by acidification. Light brown, lustrous, opaque needles from pyridine + H_2O, softens about 230°, m. 255°. Its solns. exhibit an intense bluish violet fluorescence. *Diacetyl derivative*, white and insol. *4,6-Dinitroresorcinyl bis-p'-nitrobenzoate*, $(O_2N)_2C_6H_2(OCOC_6H_4NO_2)_2$, from 4,6-dinitroresorcinol and *p*-nitrobenzoyl chloride, at 230–30°, during 2 hrs.; slender, brownish needles from glacial AcOH + H_2O, m. 178°. It is decomp. by pyridine and is reduced by $SnCl_2$, Sn and conc. HCl to *p,p'-diaminodi-α-phenylbenzdioxazole* (II); small,

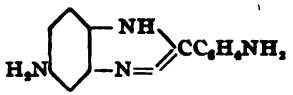


(II)

lustrous needles fron acetone + H_2O. Yield, about 5%. In alc. it exhibits a bluish violet fluorescence. *Acetyl derivative*. *p,p'-Dinitrodi-α-phenylbenzdioxazole* (III), is formed from 4,6-diaminoresorcinol hydrochloride and *p*-nitrobenzoyl chloride, at 220–40°, or, preferably, by b. them with $PhNO_2$; pale yellow needles from $PhNO_2$, m. above 300°. Yield, 120% of the hydrochloride. In b. xylene, 4,6-diaminoresorcinol hydrochloride and *p*-nitrobenzoyl chloride form *N,N'-bis-p-nitrobenzoyl-4,6-diaminoresorcinol*, $(HO)_2C_6H_2(NHCOC_6H_4NO_2)_2$; yellow flocks by acidification of its soln. in aq. NaOH, not m. 300°. At 260–70° it is converted into (III). When (III)

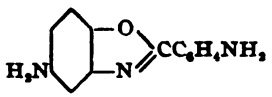


(III)



(IV)

is dissolved in conc. H_2SO_4 and poured into H_2O it is obtained in a physical condition which permits of its reduction by Sn + HCl, or, preferably, by Zn dust and AcOH, to (II). The *azo compounds* mentioned below were obtained by combining (I), (II), *p,p'*-diaminobenzimineazole (IV) and *p,p'*-diaminobenzoxazole (V) with the resp.



(V)

phenols. The colors are those produced on cotton. "Aminonaphtholdisulfonic Acid H:" (I), Dark violet; (IV), blue; (II), brownish violet; (V), lilac-violet. "β-Naphtholdisulfonic Acid:" (I), Violet; (IV), light violet; (II), bluish lilac; (V), bluish red. α-Naphthol: (I), Red with a slight violet tinge; (IV), violet-red; (II), brownish red; (V), red.

J. Bishop Tingle.

Isomerism of the Three Allocinnamic Acids. Julius Meyer. Chem. Inst., Univ. Breslau. *Ber.*, 44, 2966–70; cf. Stobbe, *C. A.*, 6, 91.—The acids are designated by their m. ps. Any one of them can be obtained from any other by inoculation of the aq.

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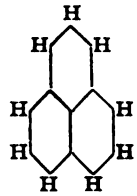
soln., provided that certain precautions as to temp. are observed. The resulting crystals require prolonged drying and protection from "infection." The velocity of transformation decreases in the order 42° ⟶ 68°; 42° ⟶ 58°; 58° ⟶ 68°. The velocity of crystn. of undercooled, molten acid decreases in the order 68°, 58°, 42°. It is pointed out that, contrary to Stobbe's statement, the occurrence, at a low temp., of an optimum in the velocity of transformation, accords with all that is known of the velocity of transformation of polymorphic modifications. No differences could be observed in the products obtained by the spontaneous crystn. of the 3 molten acids. The molten acids have the same solubility in H_2O, the following numbers refer to g. per l. MOLTEN ACID: 18.0°, 13.63; 25.0°, 14.44; 35.0°, 16.05; 45.0°, 18.11; 55°, 20.50; 65.0°, 23.43; 75.0°, 27.69. ACID 68°: 18°, 6.88; 25.0°, 8.45; 35.0°, 11.14; 45.0°, 14.46; 55.0°, 18.45. ACID 58°: 18.0°, 7.62; 25.0°, 9.37; 35.0°, 12.39; 45.0°, 160.9. ACID 42°: 18.0°, 8.95; 25.0°, 11.03; 35.0°, 14.61. The cryohydric points are 0.060° (5.03), 0.054° (4.26) and 0.046° (3.87) for the 42°, 58° and 68° acids, resp., the corresponding mol. wts. being 141, 146 and 155. The numbers above in parentheses refer to g. per l. These results indicate that Biilmann (*C. A.*, 4, 1302) is correct in regarding the acids as polymorphic modifications of *cis*-cinnamic acid.

J. B. TINGLE.

Benzene Problems. ERNST MOHR. *Ber.*, 44, 2971.—Pauly has stated (*C. A.*, 6, 93) that the prep. of the compd.



would enable a conclusion to be drawn regarding the constitution of C_6H_6. The formation of the hydrocarbon in question would accord with the centric C_6H_6 formula of Baeyer and Armstrong, but not with Kekulé's system of alternate double and single linkages. The hydrocarbon, $C_{12}H_9$, fails to accord with the rule of "even numbers." Should it ever be isolated it would belong to the class of compds. represented by triphenylmethyl. Its at. linkages, therefore, would necessarily be quite different from those prevailing in the ordinary hydrocarbons, such as C_6H_6, or naphthalene. Consequently, no valid conclusions regarding the constitution of C_6H_6 could be drawn from a study of the hydrocarbon $C_{12}H_9$. J. BISHOP TINGLE.

Ethylation of Acetone. ERNST ZERNER. Org. Chem. Lab., Univ. Paris. *Monatsh.*, 32, 677–86; see *C. A.*, 5, 3410.—The tri-, tetra-, penta- and hexa-Et derivs. of acetone are immiscible with H_2O and have an odor of camphor. Triethylacetone is reduced by Na and abs. alc. to *triethylisopropyl*, $C_9H_{20}O$; liquid b_{10} 80–1°. *Tetraethylisopropyl-alcohol*, $C_{11}H_{22}O$, is prepared in a similar manner; liquid, b_{18} 99–101°. *Phenylurethan*, crystals from alc., m. 72–3°. *Pentaethylisopropyl alcohol*, $C_{13}H_{28}O$, from pentaethylacetone; b_{18} 125–7°. *Phenylurethan*, crystals from dil. alc., m. 71–2°. When mixed with the preceding phenylurethan, m. 54°. *Hexaethylisopropyl alcohol*, $C_{15}H_{32}O$, from hexaethylacetone; liquid, b_{18} 159–61°. *Phenylurethan*, oily. J. B. TINGLE.

Synthetic Experiments in the Pyranthrone Series. ROLAND SCHOLL, JULIUS POTSCHIWAUSCHEG AND JOSEF LENKO. Chem. Inst., Univ. Graz. *Monatsh.*, 32, 687–710.—*4-Ethylbenzoyl-2′-benzoic acid*, $EtC_6H_4CO^{1,1'}C_6H_4CO_2H$, is prepared from ethylbenzene, phthalic anhydride, $AlCl_3$ and CS_2; needles from dil. alc., or xylene, m. 122°. In conc. H_2SO_4 the color is yellow, changing to reddish brown when warmed.

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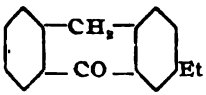
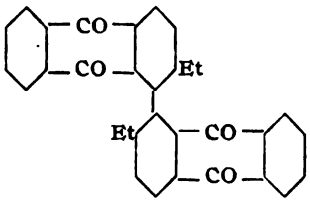
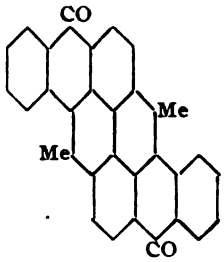
It is reduced by b. with aq. NH_3, aq. NaOH, $CuSO_4$ and Zn dust to *4-ethylbenzyl-2'-benzoic acid*, $EtC_6H_4CH_2C_6H_4CO_2H$; colorless needles from dil. alc., or glacial AcOH, m. 86°. Yield, almost quant. In conc. H_2SO_4 the color is pale yellow. After 5–10 mins., at the ordinary temp., the H_2SO_4 condenses the acid to a mixture of *2-ethyl-9-anthrone*, formula (I) below, and its enolic form; needles and pale yellow crystals from



(I)



(II)



(III)

dil. alc., m. 67–75°. Yield, good. The desmotropic modifications could not be separated. In conc. H_2SO_4 the color is yellow, changing to red when warmed. In alc., or glacial AcOH it exhibits a feeble green fluorescence. Dil., aq. NaOH converts it completely into the enolic form. *2-Ethylanthraquinone* is prepared from (I), glacial AcOH and Br; yellow needles from alc., m. 108°. In conc. H_2SO_4 the color is reddish yellow, changing to greenish yellow when warmed. At the ordinary temp., HNO_3 (d. 1.52) free from N oxides, converts the quinone into *1-nitro-2-ethylanthraquinone*, $C_{16}H_{11}O_4N$; yellowish brown needles, or plates from dil. alc., or glacial AcOH, m. 226°. In conc. H_2SO_4 the color is orange-yellow, changing to red when heated. It is reduced by NaOH + H_2S to *1-amino-2-ethylanthraquinone*, $C_{16}H_{13}O_2N$; red needles from alc. or glacial AcOH, m. 153–4°. Yield, almost quant. In conc. H_2SO_4 the color is greenish yellow, changing to dark yellow when heated. *1-Iodo-2-ethylanthraquinone*, from the amino compd., by the diazo reaction; small, lustrous, yellowish brown plates from alc., m. 149°. Yield, good. At 240°, with Cu powder, it gives *2,2'-diethyl-1,1'-dianthraquinonyl* (II); yellowish brown prisms from glacial AcOH, m. 315°. Yield, about 50%. In conc. H_2SO_4 the color is yellow, changing to violet-red when b. At 260°, alc. KOH and anhydrous AcONa convert it into *dimethylpyranthrone* (III); brown and amorphous, m. far above 300°. Yield, about 50%. In conc. H_2SO_4 the color is violet; in neutral solvents yellow with a green fluorescence. Its vat-dye with Na hyposulfite is deep violet, it dyes cotton this shade, but on exposure to air the color changes to brownish yellow and it becomes reddish after treatment with Br–H_2O. Unless otherwise stated, the compds. described below were prepared in a similar manner to the above Et derivs. *4-Propylbenzoyl-2'-benzoic acid*, $PrC_6H_4COC_6H_4CO_2H$, from propylbenzene; colorless needles from dil. HCl, m. 125–6°. The same compd. is also obtained from *p*-iodopropylbenzene, Mg and phthalic anhydride, but the method is less convenient. *4-Propylbenzyl-2'-benzoic acid*, $PrC_6H_4CH_2C_6H_4CO_2H$, slender needles from H_2O, m. 80–1°. *2-Propyl-9-anthrone*, slender, yellow, microscopic needles from dil alc., m. 60–1°. It contains some of the enolic form, because a part of it is sol. in cold, dil., aq. NaOH. *2-Propylanthraquinone*, slender, yellow needles from dil. alc., m. 98–9°. In conc. H_2SO_4 the color is reddish yellow, changing to greenish yellow on adding conc. HNO_3. Aq. NaOH + Na hyposulfite gives a red color. B. HNO_3 (d. 1.37) oxidizes the compd. to anthraquinone-2-carboxylic acid. *1-Nitro-2-propylanthraquinone*, from the Pr compd., conc. H_2SO_4 and KNO_3 and also from HNO_3 (d. 1.52); yellow plates from glacial AcOH, m. 180°. In conc. H_2SO_4 the color is greenish yellow, changing to reddish brown when heated. *1-Amino-2-propylanthraquinone*,

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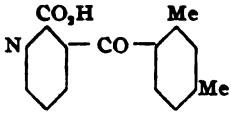
red, lancet-shaped crystals with a metallic luster from glacial AcOH, m. 172–3°. *1-Iodo-2-propylanthraquinone*, lancet-shaped aggregates of golden lustrous needles from glacial AcOH, m. 148–9°. In conc. H_2SO_4 the color is reddish brown. *2,2'-Dipropyl-1,1'-dianthraquinonyl* (see II), from the preceding compd., at 200°, in an atm. of CO_2, m. 214–5°. In conc. H_2SO_4 the color is brown, changing to dark green at about 80° and to violet-red at about 220°. With conc. H_2SO_4 and Cu powder, at 50°, the color is pure green. *Diethylpyranthrone* (see III), yellowish brown powder. Its color in neutral, low b. solvents is yellow with a green fluorescence; in $PhNO_2$, reddish brown; in conc. H_2SO_4, blue. Its *vat-dye* is deep reddish violet. The shades produced on cotton, after exposure to air, are lighter than those from pyranthrone. *4-Isopropylbenzoyl-2'-benzoic acid*, slender, silky lustrous needles from dil. alc., m. 133–4°. It dissolves in about 4000 pts. of b. H_2O. *4-Isopropylbenzyl-2'-benzoic acid*, plates from dil. alc., m. 111°. Yield, quant. *2-Isopropylanthrone* from the preceding compd. and conc. H_2SO_4, or $ZnCl_2$; oil, solidifies at 0°. It is said to contain the enolic isomer. *2-Isopropylanthraquinone*, yellow needles, m. 44–5°. In conc. H_2SO_4 the color is red. *1-Nitro-2-isopropylanthraquinone*, small, yellow plates from glacial AcOH, m. 210–1°. In conc. H_2SO_4 the color is greenish yellow, changing to reddish brown when heated. *1-Amino-2-isopropylanthraquinone*, red plates from glacial AcOH, needles with a green surface luster from alc., m. 146°, previously subliming. In conc. H_2SO_4 the color is greenish yellow, changing to reddish brown when heated. *1-Iodo-2-isopropylanthraquinone*, bundles of yellow needles from glacial AcOH, m. 133–4°. In conc. H_2SO_4 the color is reddish brown, changing to red when heated. *2,2'-Diisopropyl-1,1'-dianthraquinonyl*, rhombohedral crystals from $CHCl_3$, m. 326°. Yield, about 75%. In conc. H_2SO_4 the color is reddish yellow, changing to wine-red when heated. At 50° with conc. H_2SO_4 + Cu powder the color is green. The compd. does not appear to be changed by fusion with KOH. J. Bishop Tingle.

Compounds of 3,5-Dinitro-4-hydroxybenzoic Acid with Hydrocarbons. II. Otto Morgenstern. Chem. Lab., Imp. and Roy. Ger. Univ. Prague. *Monatsh.*, 32, 711–46; see *C. A.*, 5, 1087.—The nature of the compds. formed from 3,5-dinitro-4-hydroxybenzoic acid and the hydrocarbons mentioned below has been detd. by mixing alc. with excess of the acid, adding a little of the hydrocarbon and analyzing a portion of the soln. Similar reciprocal expts. were made with the hydrocarbons in excess. The results, which are given in numerous tables, show that, in addition to the compds. described previously, phenanthrene, fluorene and retene combine with the acid in the mol. ratio 1 : 1. The *compounds* were obtained from alc. in yellow needles, m. 180° (decomp.), pale yellow powder, m. 210–4° (closed tube) and pale yellow scales, decomp. 220° (closed tube; previously softening), resp. J. Bishop Tingle.

Toluyl and Xyloylpicolinic Acid. Ottokar Halla. Chem. Lab., Imp. and Roy. Ger. Univ., Prague. *Monatsh.*, 32, 747–51.—*β*-Tolyl pyridyl ketone is formed from nicotinyl chloride, $AlCl_3$ and toluene. *β*-Toluylpicolinic acid is obtained from toluene and quinolyl chloride *α*-methyl ester. *β,m-Xyloylpicolinic acid*,



is formed from *m*-xylene and quinolinic anhydride; crystals from H_2O, m. 142°. *Copper salt*, blue. At 150–240°, the acid is converted into *β,m-xylylpyridyl ketone*; oil. *Picrate*, yellow plates from alc., m. 134°. The ketone was also obtained from *m*-xylene and nicotinyl chloride ester. J. Bishop Tingle.

Mutual Decomposition of Azines and Semicarbazones. Gustav Knöpfer. Chem.

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Lab., Ger. Agric. Oberrealsch., Brünn. *Monatsh.*, 32, 753–72.—The azines of the aldehydes and ketones mentioned below are converted into semicarbazones by the action of semicarbazine. The results of treating these semicarbazones with N_2H_4 are indicated by S = semicarbazone, or A = azine. The compd. formed by the interaction of the resp. ketones and aldehydes with a mixture of N_2H_4 and semicarbazine is denoted by the same letters, in italics. All the expts. were made in alc. unless otherwise stated. BzH, S, *S*; salicylic aldehyde, A, *S*; *p*-hydroxybenzaldehyde, A, *S*; vanillin, S, *S*; anisic aldehyde, S, *S*; cuminaldehyde, S, *S*; piperonaldehyde, S, *S*; furfuraldehyde, S, *S*; *o*-nitrobenzaldehyde, S, *S*; *m*-nitrobenzaldehyde, S, *S*; *p*-nitrobenzaldehyde, in glacial AcOH, A, *S* + *A*; cinnamic aldehyde, S, *S*; *p*-dimethylaminobenzaldehyde, in glacial AcOH, A, *S* + *A*; resorcinaldehyde, A, *S*; pyrocatechuic aldehyde, A, *S*; acetophenone, S, *S*; benzylideneacetone, S, *S*; ethyl phenyl ketone, in glacial AcOH, S, *S*; acetone, A, S. *Ethylphenylketazine*, $C_{18}H_{20}N_2$, from the ketone and N_2H_4; yellow needles from alc., m. 79–80°. Semicarbazone, m. 179–80°, not 173–5°, or 182°. *Dibenzalacetonesemicarbazone* is formed in AcOH; white needles from alc., m. 187–90°. *α-Dichloroacetonesemicarbazone*, white crystals from alc., m. 163°. It decomp. readily into methylglyoxaldisemicarbazone, $H_2NCONHN : CMeCH : NNHCONH_2$, which is also formed simultaneously with the dichloro compd. With PhN_2H_3 it gives the phenylosazone, the transformation being reversed by semicarbazine. Chloralsemicarbazide is formed from chloral, or its azide and semicarbazine. B. H_2O hydrolyzes it to *semicarbazoneglyoxylic acid*, $H_2NCONHN : CHCO_2H$; white solid, m. 235–8°. *Chloral hydrazide*, $Cl_3CCH(OH)NHNH_2$, from chloral hydrate, or the semicarbazide and N_2H_4. H_2O; white, unstable crystals, m. 85° (decomp.). Yield, nearly quant. Chloral hydrate when treated with a mixture of $N_2H_4.H_2O$ and semicarbazine gives the semicarbazide.

J. Bishop Tingle.

Trihydroxybenzoic Acid. Franz v. Hemmelmayr. Chem. Lab., Agric. Oberrealsch., Graz. *Monatsh.*, 32, 773–91.—In glacial AcOH, Br and phloroglucinolcarboxylic acid give *dibromophloroglucinol*, $C_6H_4O_3Br_2$, which is also formed directly from phloroglucinol; colorless needles with $5.5H_2O$, m. 171–2°. *Triacetyl derivative*, colorless needles from alc., m. 128–9°. Pyrogallolcarboxylic acid evolves CO_2 when b. with H_2O. With Br, as above, it gives *2,3,4-trihydroxy-5-benzoic acid*, $(HO)_3C_6HBrCO_2H$, yellow needles with $1 H_2O$ from alc. + H_2O, decomp. 230°. *Barium salt*, dark plates with $6 H_2O$. *Methyl ester*, from the acid, MeOH and H_2SO_4; colorless needles with $1 H_2O$, from dil. alc., m. 135°. The acid evolves CO_2 when b. with H_2O and a portion of its Br by b. with aq. NaOH. With Br, in glacial AcOH, it gives di- or tribromogallol. *Barium hydroxyhydroquinolcarboxylate*, slightly brown crystals with $1 H_2O$. Only 1.1% of ester is formed by b. the acid with MeOH + HCl. The acid evolves CO_2 when b. with H_2O. With Br, as above, it gives *bromohydroxyhydroquinolcarboxylic acid*, $C_7H_5O_5Br$; feathery needles with $2 H_2O$ from H_2O, m. 199° (decomp.), previously softening. It is not esterified by MeOH + H_2SO_4 and is oxidized to $C_2H_2O_4$ by HNO_3. With b. H_2O it evolves CO_2. *Barium salt*, large, almost colorless crystals with $8 H_2O$. With Br, as above, it gives *dibromohydroxyhydroquinol*, $C_6H_4O_3Br_2$; almost colorless, prismatic crystals. These results indicate that "hydroxyhydroquinolcarboxylic acid" is probably *2,3,6-trihydroxybenzoic acid* and that the Br in the bromo acid is probably at 5. Gallic acid and its mono- and di-Br derivs. evolve CO_2 when b. with H_2O.

J. Bishop Tingle.

Rearrangement of Quinine by means of Sulfuric Acid. Bruno Bottcher and Stefanie Horowitz. II Chem. Lab., Univ. Vienna. *Monatsh.*, 32, 793–6; see Paneth, *C. A.*, 5, 2843.—At 100°, during 3 hrs., quinine bisulfate and H_2SO_4 (6 pts.) (d. 161) is converted into 2 *bases* (A) and (B), which are separated as tartrates. (A), long, rectangular, transparent plates from C_6H_6 + petroleum ether, m. 193.5° (cor.). It gives

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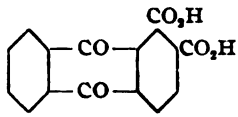
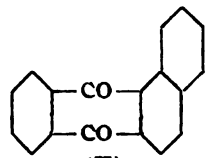
an intense thalleioquinine reaction with alc., Cl-H_2O and NH_3 and an intense blue fluorescence in conc. H_2SO_4. In alc., $[\alpha]_D$ —237.89°. *Sulfate*, bundles of small needles from H_2O; in alc., $[\alpha]$ —234.5°. *Oxalate*, readily sol. *Tartrate*, sparingly sol. (B), small, white needles from alc. + H_2O, m. 189° (cor.); in alc., $[\alpha]_D$ —181.670°. Its reactions resemble those of (A). *Oxalate*, sparingly sol. *Tartrate*, readily sol. A mixture of (A) and (B), m. 181.5° (cor.). Similar results were obtained with quinine bisulfate and H_2SO_4 (d. 1.841, or 1.51), but the yield of bases was smaller. The base (B) may be identical with Lippmann and Fleissner's isoquinine, which, contrary to Skraup's statement, is apparently not a mixture. The base (A) is not identical with Skraup's pseudoquinine and, hitherto, this latter has not been found among the reaction products. J. Bishop Tingle.

Addition of Hydrogen Bromide to Cinnamylidenemalonic Acid, Cinnamylideneacetic Acid and Phenylbutadiene. C. N. Riiber. *Ber.*, **44**, 2974–8.—The additive compd. of cinnamylidenemalonic acid and 1 HBr was treated with Mg + Et_2O, containing a little HBr, then with H_2O; the resulting dihydrocinnamylidenemalonic acid, with $KMnO_4$, gave BzOH and succinic acid. The same results were obtained with Me cinnamylidene acetate. *Hydrobromocinnamylideneacetic acid*, $C_{11}H_{11}O_2Br$, is formed in H_2O at 0°; small needles from C_6H_6 + ligroin, m. 128°. *Hydrobromophenylbutadiene*, PhCH : CHCHBrMe, oil. With $ZnMe_2$ it gives a *hydrocarbon*, PhCH : CHCHMe$_2$; mobil liquid, b_{13} 84–6°. $KMnO_4$, in acetone, oxidizes it to BzOH and isobutyric acid. The *compound*, $C_{10}H_9Br.2HBr$, is formed together with the hydrobromophenylbutadiene; crystals, m. 146°. These results show that HBr adds to the cinnamylidene compds. in the 1,2-positions. J. Bishop Tingle.

Degradation of 1,2-Benzanthraquinone ("Naphthanthraquinone") to Anthraquinone-1,2-dicarboxylic Acid Roland Scholl and Emil Schwinger. Chem. Inst., Univ. Graz. *Ber.*, **44**, 2992–8.—*Anthraquinone-1,2-dicarboxylic acid*, formula (I) below, is formed from 1,2-benzanthraquinone (II) as follows: (1) B. dil. H_2SO_4 and



(I)



(II)

$KMnO_4$; (2) acetone + $KMnO_4$; (3) HNO_3 (d. 1.15) at 190–5°; (4) $KMnO_4$, in neutral, aq. soln. Yield: (1), 75.5%; (2), traces; (3), about 22%; (4), small. Slender, pale yellow needles with 1 H_2O from H_2O, m. 267–8°. At 20°, it dissolves in about 2200 and at 100° in about 250 parts of H_2O. *Mono- and diammonium* and *disodium salts*. Anthraquinone is formed by distilling (I) with $Ca(OH)_2$. *Anhydride*, $C_{16}H_6O_3$, from (I) at 250°; small, yellow, highly lustrous, rectangular plates from $PhNO_2$, yellow rods and plates by sublimation, m. 319–21°. Dry NH_3 converts it into the *imide*, $C_{16}H_7O_2N$; yellow needles from glacial AcOH, m. 293°. It may be sublimed and it gives a yellow color with conc. H_2SO_4. Its *vat dye*, from NaOH and "hyposulfite" is green, then dark brownish red; when shaken with air it becomes light red, then yellow and finally almost colorless. When b. with more "hyposulfite" this liquid becomes dark red, shaking with air changes its successively to light red, violet, blue and colorless.

J. B. T.

Constitution of the Nitro-2,6-dimethylbenzimineazole Obtained by Nitration. D. Maron and D. Salzberg. Univ. Lab., Geneva. *Ber.*, **44**, 2999–3005.—5-Nitro-2,6-dimethylbenzimineazole (Niementowski) is reduced by Fe and dil. AcOH to *5-amino-2,6-dimethylbenzimineazole*, formula (I) below; thick, white needles with 2 H_2O,

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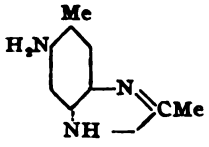
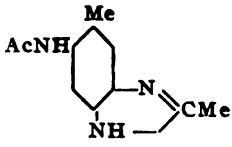
from H_2O, m. 85°. It may be diazotized. *Hydrochloride*, olive-colored, not m. 296°. *Acetyl derivative*, (II), pale red needles from H_2O, m. 263–4°. *5-Amino-2,4-bisacetyl-*



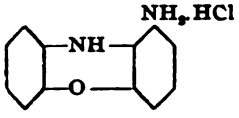
(I)



(II)

aminotoluene, $(AcNH)_2C_6H_2MeNH_2$, from the nitro compd. as above; crystals from H_2O, m. 252–3°. With HNO_2 it gives a cryst. *azimide* and at 250° is converted into (II). *6-Amino-3,4-bisacetylaminotoluene* is prepared like its isomer; hard, pale yellow needles, m. 238°. It may be diazotized. *Triacetyl-3,4,6-triaminotoluene*, $(AcNH)_3C_6H_2Me$, is prepared from each of the above aminobisacetylaminotoluenes; crystals from H_2O, m. 273–4°. J. B. T.

1-Aminophenazoxonium. F. KEHRMANN AND L. LÖWY. Org. Lab., Univ. Lausanne. *Ber.*, 44, 3006–11.—*1-Aminophenoxazine hydrochloride*, formula (I) below,



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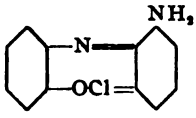

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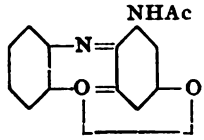
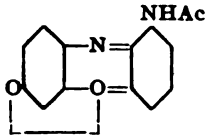


(III)

is prepared from the nitro compd., $SnCl_2$ and conc. HCl; pale red needles. *Acetyl derivative*, colorless, lustrous needles from alc., m. about 197° (decomp.). *1-Aminophenazoxonium chloride* (II) from (I) and $FeCl_3$; small, greenish black, lustrous crystals. It is unstable as also is the *amine* from (I). *Nitrate*, lustrous, blackish green needles. *Chloroplatinate*, almost black crystals with a bluish luster. In conc. H_2SO_4 the color is orange-red, changing to yellowish green with a bluish green luster. *Bromide*. *Iodide*, dark green, microscopic crystals. With $FeCl_3$, 1-acetaminophenoxazine is oxidized to the *acetaminophenazoxones* (III) and (VI), which are sepd. by b. H_2O; the less sol.



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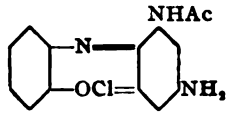

(V)

forms yellowish red needles, the other lustrous, dark red granules, both m. about 215°. Both compds. give a yellowish red color in conc. H_2SO_4; on adding ice the soln. of the needles becomes brownish red, that of the granules dull violet. *1-Acetamino-3-aminophenazoxonium chloride* (V), from 1,3-diaminophenazoxonium chloride; dark red prisms with a slight green, metallic luster. *Zinc chloride*, lustrous, pale red crystals. *Chloroplatinate*, brownish red, cryst. powder. *Base*, yellow, cryst. flocks, m. 185–90° (decomp.). J. B. T.

Derivatives of 1,3-Diaminophenazthionium. F. KEHRMANN AND J. STEINBER. Org. Lab., Univ. Lausanne. *Ber.*, 44, 3011–7.—*Dipicryldiaminodiphenyl disulfide*, $(O_2N)_3C_6H_2NHC_6H_4SSC_6H_4NHC_6H_2(NO_2)_3$, from picryl chloride and *o*-diaminodiphenyl

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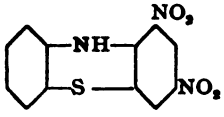
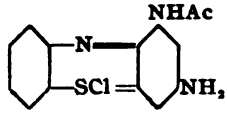
sulfide hydrochloride; orange-yellow, cryst. powder from xylene. Alc. Na_2S, followed by NaOH, converts it into 1,3-dinitrophenthiazine, formula (I) below, which is identical



(I)



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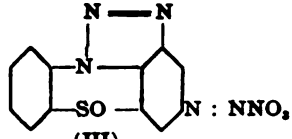
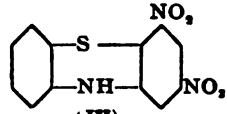


(III)

with the compd. from picryl chloride and *o*-aminothiophenol. *1-Acetamino-3-aminophenazthionium chloride* (II), from 1,3-diaminophenazthionium chloride; long, slender needles with a violet, metallic luster from alc. *Zinc chloride*, violet-black, cryst. powder. *Nitrate*. *Iodide*, dark green flocks. *Chloroplatinate*, greenish black powder. *Bichromate*, dark green flocks. *Chloroaurate*, brown and cryst. *Base*, brick-red, interlaced needles from alc. A compound (III) is formed by diazotizing 1,3-diaminophenazthonium and treating the product with $NaNO_2$; brownish yellow, explosive needles from H_2O. *Chloroplatinate*, orange-colored, cryst. powder. In H_2O, at 80°, (III) evolves gas and gives a *compound*, $C_{12}H_7ON_3S$; brownish red flocks from H_2O. These results confirm those of Kehrmann and Schild (*Ber.*, **32**, 2605 (1899)) and show that the compd. from *o*-aminothiophenol and picryl chloride is not (IV) as stated by



(IV)

Mitsugi, Beyschlag and Möhlau (*C. A.*, **4**, 1753). J. B. T.

Azodicarboxylic Ester. Otto Diels and Paul Fritzsche. Chem. Inst. Univ., Berlin. *Ber.*, **44**, 3018–27.—*Azodicarboxyldipiperidide*, $C_5H_{10}NCON : NCONC_5H_{10}$, from the di-Et ester and piperidine; thick, golden yellow prisms from MeOH, m. 134–5° (decomp.). Yield, 69%. The ester gives *additive compounds* with $PhNH_2$ and $PhNMe_2$; the former, $C_{13}H_{17}O_4N_3$, is deposited from MeOH in small, colorless plates and prisms from MeOH, m. 138°. Yield, 75% of the ester. The 2nd compd., $C_{14}H_{21}O_4N_3$, colorless, microscopic crystals from C_6H_6, m. 75–6°. Yield, about 75% of the ester. Hydroquinol and the ester give *p*-quinone and di-Et hydrazodicarboxylate (see below). *Methyl hydrazinecarboxylate hydrochloride*, $H_2NNHCO_2Me.HCl$, is prepared from Me chlorocarbonate and $N_2H_4.H_2O$; colorless, iridescent plates from alc., m. 160°. Yield, 49%. *Base*, bundles of prisms from Et_2O, or C_6H_6, m. 63°, b_{12} 108°. It may be sublimed and is volatil with steam. Yield, 92%. *Benzal derivative*, $PhCH : NNHCO_2Me$, long, thick, colorless prisms from H_2O, or dil. alc., m. 146°. Yield, almost quant. *Methyl semicarbazidecarboxylate*, $H_2NCONHNHCO_2Me$, from the hydrochloride and KCNO; small, colorless crystals from abs. alc., m. 169–70°. Yield, 83%. *Dimethyl hydrazodicarboxylate*, $MeO_2CNHNHCO_2Me$, from Me hydrazinecarboxylate and Me chlorocarbonate (yield, 97%), or from Me hydrazinecarboxylate hydrochloride and KOH (yield about 62.5 of the ester); colorless prisms from abs. Et_2O, or abs. alc., m. 131°. It is extremely stable. *Dimethyl azodicarboxylate*, $MeO_2CN : NCO_2Me$, from the preceding compd. and HNO_3; mobil oil, b_{26} 96°. Yield, almost quant. With Me hydrazinecarboxylate it gives an unstable *additive compound*, $C_6H_{10}O_6N_4$; viscid, highly refractive oil with an aromatic odor. J. B. T.

Derivatives of Phthalic Acid Containing Sulfur and Nitrogen. Arnold Reissert and Hermann Holle. Lab. Univ., Marburg. *Ber.*, **44**, 3027–40.—*Thiophthalic*

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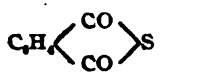
anhydride, formula (I) below, is prepared from phthalic anhydride and Na_2S, followed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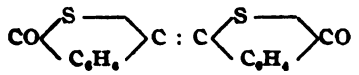
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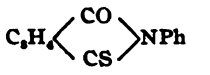
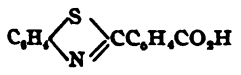

(III)

by HCl; colorless needles from C_6H_6, or alc., m. 114°. Yield, 68.5%. It is reduced to phthalide by Na-Hg. *Diethyl thiophthalate*, $EtSCOC_6H_4CO_2Et$, from (I) and EtONa, followed by EtI; colorless liquid, b_{10} about 194°. *Ethyl methylthiophthalate*, $MeSCOC_6H_4CO_2Et$, as above, but with MeI; colorless liquid with an odor of garlic, b_{16} 209°; d. 1.1923. Yield, 80%. Alc. NaOH hydrolyzes it to phthalic acid, EtOH and MeSH. *Methyl ethylthiophthalate*, $EtSCOC_6H_4CO_2Me$, from NaOMe and EtI; it has the same b. p., color and odor as the isomer, d. 1.1906. Yield, 75%. The ester is hydrolyzed to phthalic acid, MeOH and EtSH. *Methyl 2,4-dinitrophenylthiophthalate*, $(O_2N)_2C_6H_3SCOC_6H_4CO_2Me$, from 2,4-dinitrochlorobenzene and Me Na thiophthalate, under special conditions; small, compact, yellow prisms from C_6H_6, m. 121°. *Dimethyl dithiophthalate*, $C_6H_4(COSMe)_2$, from thiophthalic anhydride and Na_2S, followed by MeI, or Me_2SO_4; small, yellowish brown plates, or needles from benzine, m. 124°. It is hydrolyzed by alc. NaOH to phthalic acid and MeSH. Dithiodiphthalyl (VII) is formed by b. di-Na dithiophthalate in dil. aq. soln. *Thiophthalanil* (III), is prepared from phthalanil and P_2S_5 in b. xylene and is purified by hydrolysis to the anilic acid; long, red needles from acetone, m. 144°. It was not quite pure. *Thiophthanilic acid*, semi-solid. *o-Carboxyphenylbenzthiazole* (IV), is obtained from thiophthalanilic acid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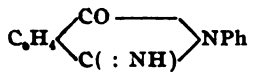
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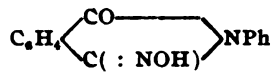
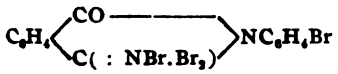

(VI)

and $K_3Fe(CN)_6$; colorless, prismatic crystals from alc. + H_2O, m. 189°. *Copper salt*, $Cu(C_{14}H_8O_2NS)_2$, slender, light blue crystals. *Calcium salt*, $HOCaC_{14}H_8O_2NS$, bundles of silky lustrous needles resembling asbestos from H_2O. *Ammonium* and *alkali salts*. *Hydrochloride*, $C_{14}H_9O_2NS.HCl$, from dry HCl, in Et_2O; cryst. *Methyl ester*, from the acid, MeOH and HCl; colorless needles, or plates, m. 73°. Phenylbenzthiazole is formed by distilling the above Ca salt. Phthaldianil is produced by b. (III) with $PhNH_2$. *Iminophthalanil* (V), is prepared from thiophthanil and carbamide, at 140–50°; small, yellow needles from C_6H_6, m. 170°. Yield, 64%. It is strongly basic. *Methyliminophthalanil* from (V), Me_2SO_4 and NaOH; lustrous, yellowish brown plates from ligroin, m. 145°. *Benzyliminophthanil*, from (V), NaOEt and benzyl chloride, pale yellow plates from ligroin, m. 120°. *Oximinophthalanil* (VI), from (III) and $HONH_2$; small, colorless needles from dil. alc., m. 246° (decomp.). It is a moderately strong base. *Bromoiminophthalbromoanil dibromide* (VII), from (V)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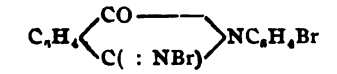
(VIII)

and Br, in $CHCl_3$; brownish needles from glacial AcOH, becomes reddish brown 180°, then lighter, m. 242°. It evolves 2 Br slowly at the ordinary temp. and in a vacuum, evolves HBr. Yield, 190% of (V). *Bromoiminophthalbromoanil* (VIII), from (VII), at 180°; colorless plates from glacial AcOH, m. 242°. J. B. T.

Strychnose Alkaloids. XII. Derivatives of Bisapomethylbrucine. HERMANN LEUCHS AND RUDOLPH ANDERSON. Chem. Inst., Univ. Berlin. *Ber.*, **44**, 3040–9; see *C. A.*, **5**, 3430.—The following additional derivs. of bisapomethylbrucine have been prepared: *Hydrobromide*, $C_{21}H_{22}O_4N_2.HBr$, long, silky lustrous needles with 2 H_2O.

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Zinc chloride, $C_{21}H_{22}O_4N_2.H_2ZnCl_4.H_2O$, massive crystals. *Diacetyl derivative*, long, almost colorless needles from ligroin, m. 232–3° (vacuum tube). *Methiodide*, long, colorless needles with 1 H_2O, from MeOH, m. about 280° (darkens, decomp.). Yield, 60% of the bisapomethylbrucine. It gives a red color with HNO_3. Conc. HNO_3 converts bisapomethylbrucine into *nitrobisapomethyldehydrobrucine nitrate*, $C_{21}H_{19}O_8N_3.HNO_3.3H_2O$, small, orange-colored needles from HNO_3. It gives a violet color with SO_2 + HCl, or $SnCl_2$. Yield, 43% of the parent base. Warm HNO_3 (10%) converts it into cacotheline, $C_{21}H_{21}O_7N_3.HNO_3.H_2O$, which is also formed from HNO_3 (10%) and bisapomethylbrucine hydrochloride. *Brucine dimethylsulfate*, $C_{25}H_{32}O_8N_2S.2.5H_2O$, is prepared from bisapomethylbrucine hydrochloride, aq. NaOH and Me_2SO_4, or from brucine and Me_2SO_4, in $CHCl_3$; trimorphic; needles from conc., alkali soln., long, thin hexagonal plates from supersaturated alc. soln., long, pointed prisms from conc. aq. soln., m. 268° (decomp.). It gives the red brucine reaction and has a strongly bitter taste. Yield, 75%, or 60% of the brucine, resp. Aq. NaOH converts it into methylbrucine, m. about 300° (decomp.) not "about 276°." It contains 5, not 4 H_2O. *Acetylmethylbrucine*, $C_{26}H_{32}O_6N_2.5H_2O$, thin, colorless plates from AcOEt, softens about 120°, solidifies, m. 157–8°. Yield, 50% of the sulfate. *Cacotheline methyl nitrate*, $C_{21}H_{21}N_3O_7.MeNO_3.2H_2O$, from methylbrucine and HNO_3 (10%); orange-colored plates, chars without m. about 280°, explodes when heated rapidly. Yield, 70% of the methylbrucine; cf. following abstr. J. B. T.

Strychnose Alkaloids. XIII. Isolation of a Fourth Brucinesulfonic Acid. HERMANN LEUCHS AND WALTER GEIGER. Chem. Inst., Univ. Berlin. *Ber.*, **44**, 3049–51; cf. preceding abstr. and *C. A.*, **4**, 168.—A fourth *brucinesulfonic acid*, $C_{23}H_{26}O_7N_2S.4H_2O$, is formed by the interaction of brucine, MnO_2 and SO_2 and is sepd. by its very sparing solubility in H_2O; large, lustrous prisms, Δ in aq. alkali hydroxide, $[\alpha]_D^{20}$ —122.2°. It dissolves in 170 parts of b. H_2O. The isomeric acids have $[\alpha]_D^{20}$ —242°, +29° and +157°, resp. and dissolve in 12, 55 and 55 parts of b. H_2O, resp. J. B. T.

Cholesterol. XIII. Cholesterylamine. A. WINDAUS AND J. ADAMLA. Med. Dept. Lab., Univ. Freiburg i/B. *Ber.*, **44**, 3051–8.—*Cholesterylurethan*, $C_{29}H_{47}O_2N$, is prepared from cholesterol and carbamide, at 220°; long needles from alc., m. 212–3°. Yield, 35% of the cholesterol. It gives no color with Salkowski's test; a green color is produced by Liebermann's test, in presence of excess of conc. H_2SO_4. At 180°, in presence of NH_4I, conc., alc. NH_3 and cholesteryl chloride form *cholesterylamine*, $C_{27}H_{45}NH_2$; plates from MeOH, m. 98°. It gives a reddish violet color by Liebermann's test, but no color with Salkowski's. *Hydrochloride*, long, white needles, softens above 330°. *Sulfate*, slender needles. *Nitrate*. *Chloroplatinate*, pale yellow powder. *Picrate*, bundles of long, thin, yellow prisms, darkens 250°, m. 274–5° (decomp.). *Acetyl derivative*, lustrous, quadratic plates from alc., m. 243–4°. Its color reactions are identical with those of cholesterol. *Benzoyl derivative*, long, thin prisms from AcOEt, m. 236°. Cholesterylamine appears to form an *additive compound* with digitonin. *Cholestenoneoxime* is reduced by Na and b. alc. to a mixture of 3 *cholesterylamines* which are separated by their Ac derivs. Yield, 60%. The mixture forms prisms from alc., m. about 98°. *Sulfate*, rods. *Picrate*, long, pointed needles, decomp. 253°. *Chloroplatinate*, pale yellow powder, decomp. 252°, previously darkening. *Benzoyl derivative*, long needles from alc., m. 203°. It is probably a deriv. of β-cholesterylamine (see below). The Ac derivs. were separated by treatment with Et_2O. The insol. compd. is identical with the above acetylcholesterylamine, m. 243–4°. Yield, about 14%. The chief product is *β-acetylcholesterylamine*, long, thin needles from alc., m. 216–7°. The most sol. isomer is *γ-acetylcholesterylamine*, large, opaque rods from MeOH, m. 190°. J. B. T.

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Action of Sodium Amalgam on Naphtholcarboxylic Acids. HUGO WEIL. Weil's Chem. Lab., Munich. *Ber.*, 44, 3058–62.—In presence of Na_2SO_3, $NaHSO_3$ and H_3BO_3, Na-Hg reduces 1,2-naphtholcarboxylic acid to 1,2-naphtholaldehyde. Under similar conditions, 2,3-naphtholcarboxylic gives tetrahydronaphthalenealdehyde; naphthalene-α-carboxylic acid is not changed and naphthalene-β-carboxylic acid yields a little β-naphthalenealdehyde. At —5°, in presence of H_3BO_3, 2,3-naphtholcarboxylic acid gives hydronaphthalenealdehyde (phenylhydrazone, m. 106.5°). The tetrahydroaldehyde was obtained from acetyl-, amino-, bromo-, or chloro-2-naphthol-3-carboxylic acid. 4-Amino-1,2-naphtholcarboxylic acid is not changed, but 4-sulfo-1,2-naphtholcarboxylic acid gives 1,2-naphtholaldehyde. Bromo-1-naphthol-2-carboxylic acid, in presence of $NaHSO_3$ and H_3BO_3, is reduced by Na-Hg to *bromo-1-naphthol-2-aldehyde*, $C_{11}H_7O_2Br$; yellow needles from alc., m. 112°. It was not quite pure. Yield, about 30%. *Phenylhydrazone*, yellow plates, m. 159°. *Anil*, $C_{17}H_{12}ONBr$, orange-yellow needles, m. 161°. *o-Toluil*, yellowish red needles, m. 188°. *p-Toluil*, large, yellowish red needles, m. 171°. *α-Naphthyl*, red and cryst., m. 196°. *Chloro-1-naphthol-2-carboxylic acid*, $C_{11}H_7O_3Cl$, from 1,2-naphtholcarboxylic acid and Cl, in glacial AcOH; crystals from alc., m. 228°. Yield, 85%. It is reduced as above to *chloro-1-naphthol-2-aldehyde*; yellow needles from alc., m. 103°. Yield, about 50%. *Oxime*, crystals from alc., m. 194°. *Phenylhydrazone*, yellow plates, m. 153°. *Azine*, $C_{22}H_{14}O_2N_2Cl_2$, from N_2H_4; yellow needles, m. 179°. *Anil*, yellow needles, m. 157°. *o-Toluil*, orange-yellow and cryst., m. 183°. *p-Toluil*, orange-yellow and cryst., m. 164°. *α-Naphthyl*, reddish yellow plates, m. 188°. *Sodium salt* of the aldehyde, yellow plates. The Cl and Br in the above compds. are supposed to be in the "*p*-position," because the acids combine with diazonium compds., halide acid being eliminated. J. B. T.

Primary 4-Hexene Iodide. J. V. BRAUN AND H. DEUTSCH. Chem. Inst., Univ. Breslau. *Ber.*, 44, 3062–5; cf. *C. A.*, 5, 2828.—*Hexene iodide*, MeCH : $CHCH_2CH_2CH_2I$, is prepared by the interaction of 1,4,5-tribromohexane, Mg and I, in Et_2O; slightly colored liquid with a faint odor, b_{22} 70–5°. Yield, 50% of the tribromide. With alc. NMe_3 it gives *hexeneyltrimethylammonium iodide*, MeCH . $CHCH_2CH_2CH_2NMe_3I$; highly hygroscopic crystals, m. about 110°. This result confirms Merling's formula $CH_3 : CHCH_2(CH_2)_2CH_2NMe_3$, for the ammonium base obtained by the exhaustive methylation of α-pipecoline. J. B. T.

Relationship between Bisnitroso Compounds and Arylnitrosohydroxylamines. EUG. BAMBERGER. Anal. Chem. Lab. Fed. Techn., Hochsch. Zurich. *Ber.*, 44, 3066–72.—Bisnitrosylbenzyl, *d*-bisnitrosocarone, isosafrole pseudonitrosite and anethole pseudonitrosite are colorless (dimol.) in soln., at the ordinary temp. When the solns. are heated they become bluish green, greenish yellow, bluish green and greenish blue, resp., showing that the monomol. modification is produced. The colors disappear on cooling and reappear on heating. Contrary to v. Baeyer's views, (*Ber.*, 28, 642–3 (1895)) the author regards the action of HCl (or H_2SO_4) on the dimol. compds. as occurring in the following stages: RNO...RNO ⟶ 2 RNO (monomol.) ⟶ RCl + NOH ⟶ HONRNO. J. B. T.

Asymmetric Nitrogen Atoms. XLIII. Cryoscopic Behavior of Quaternary Aromatic Ammonium Salts in Bromo Form and the Cryoscopic Measurement of their Velocity of Decomposition. E. WEDEKIND AND F. PASCHKE. Inorg. Dept. Chem. Lab., Univ. Strassburg. *Ber.*, 44, 3072–80.—The following compds. have the mol. wts. stated, in $CHBr_3$ (constant 151): Anthracene, 178–80; I, 250; propylmethylbenzylphenylammonium bromide, 704.8; allylmethylbenzylphenylammonium bromide, 765.1; propylmethylbenzylphenylammonium iodide, 786; isobutylmethylbenzylphenylammonium iodide, 754; allylmethylbenzylphenylammonium *d*-camphorsulfonate, 964; triethylamine hydrochloride, 223; allylmethylbenzylphenylammonium

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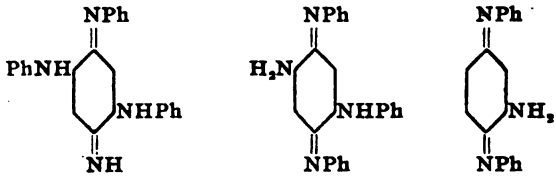
bromide (in H_2O), 158. The halogen salts decomp. rapidly. The following values (K) were obtained for the velocity of the decomp. of allylmethylbenzylphenylammonium bromide in $CHBr_3$, after the number of mins. stated in italics, a correction being made for the decomp. products of the solvent: *1080*, 63.10^{-6}; *2880*, $4.8.10^{-6}$; *4320*, $4.5.10^{-6}$; *5640*, $4.4.10^{-6}$. The following values were obtained by the polarimetric method for an active modification of the salt: *360*, $6.1.10^{-6}$; *3030*, $6.0.10^{-6}$; *4530*, $7.2.10^{-6}$; *11220*, $7.5.10^{-6}$. In $CHCl_3$, at 25°, the initial specific conductivity of allylmethylbenzylphenylammonium iodide was $2.6.10^{-6}$; after 150 mins. $1.8.10^{-6}$. J. B. T.

Oxidation of Aniline. III. Riko Majima and Yoshihiko Aoki. Chem. Lab., Univs. Tokyo and Sendai, Japan. *Ber.*, **44**, 3080–4; cf. *C. A.*, **5**, 1442.—*Aminoanilinoquinonedianil* formula (I), or (II) below, is prepared by adding gradually PbO_2



(I) (II) (III)

(80 g.) to a mixture of $PhNH_2$ (30 g.), glacial AcOH (20 g.) and H_2O (600 cc.), m. 167° (cor.); mol. wt. in b. $CHCl_3$, 374–84; in freezing C_6H_6, 363–47. Yield, 20% of the $PhNH_2$. The compd. is identical with Börnstein's "aminoquinonedianil" (III) (*Ber.*, **34**, 1268 (1901)). B. AcOH converts it into azophenine. *Hydrochloride*, black, transmits dull brown light. *Dihydrochloride*, $C_{24}H_{20}N_4.2HCl.3H_2O$, steel-colored, transmits purple light. *Acetyl derivative*, $C_{26}H_{22}N_4O$, long, bluish red prisms from alc., m. 212°. J. B. T.

Compounds of the Propane Series. II. S. Gabriel. Univ. Lab., Berlin. *Ber.*, **44**, 3084–91; cf. *C. A.*, **5**, 3265.—*β*-Phthalimidopropene, $C_8H_7O_2$: NCMe : CH_2, is volatil with steam and is hydrolyzed by b. dil. acids to phthalic acid and acetone. With Br it gives *β-phthalimide-α,β-dibromopropane*, $C_8H_7O_2$: $NCBrMeCH_2Br$; lustrous needles from ligroin m. 86–9°. In presence of H_2O it decomp. slowly into phthalimide and bromoacetone. Distillation converts it into a mixture of 2 *compounds* probably $C_8N_4O_2$: NC(: CH_2)CH_2Br and $C_8H_7O_2$: NCMe : CHBr, which are sepd. by ligroin The less sol. gives flat plates and needles from alc., m. 150–1°. The 2nd compd. crystallizes from petroleum ether in flat needles, softens 86°, m. 90–1°. Distillation of phthalimidoisobutyric acid and PBr_5 gives *β-phthalimidodibromopropene*, $C_8H_7O_2$: $NC_3H_3Br_2$, which is also formed from phthalimidoisobutyryl chloride and Br; lustrous needles from alc., m. 169–70°. At 0°, phthalimidoisobutyric acid, red P and Br in large excess give *β-phthalimidotribromopropene*, $C_8H_7O_2$: $NC_3H_2Br_3$; opaque needles resembling gypsum from ligroin, m. 106–7°. B. H_2O hydrolyzes it to phthalic acid. Aq.-alc. KOH converts it into HBr and a *dibasic acid*, $C_{11}H_9O_5N$; small needles from alc., or AcOEt, blackens about 135°, decomp. 141–4° (gas evol.). It is unstable and its aq. soln. reduces warm Fehling's soln. *Silver salt*, $C_{11}H_7O_5NAg_2.1.5H_2O$, cryst. and pulverulent. *Barium salt*, red-like aggregates with $3H_2O$. *Phthalimidotrimethylene tribromide*, $C_{11}H_9O_2NBr_3$, colorless needles from alc., softens 159°, m. 162–3°. J. B. T.

α-Aminoisobutyrophenone, H_2NCMe_2Bz. S. Gabriel. Univ. Lab., Berlin. *Ber.*, **44**, 3091–2; cf. *C. A.*, **5**, 1426.—α-Aminoisobutyrophenone crystallizes from petroleum ether in lustrous, flat needles, or rhombohedra, m. 105–6°. It appears to be an *anhydride*, $C_{20}H_{24}O_2N_2$, of the simple amine $C_{10}H_{13}ON$. It fails to impart an

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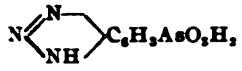
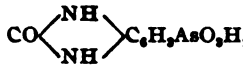
alkaline reaction to H_2O, but when moistened and placed on litmus paper the latter becomes blue. B. H_2O regenerates the amine. *Chloroplatinate*, $(C_{14}H_{18}ON)_2.H_2PtCl_6$, octahedral crystals, softens about 195°, m. 205–6°. J. B. T.

Nitro- and Aminoarsanilic Acid A. BERTHEIM. Chem. Dept. George Speyer's House, Frankfort, a/M. *Ber.*, 44, 3092–8.—A pure mononitro compd. could not be obtained from arsanilic acid, or from its Ac deriv. *Oxanilarsinic acid*, $H_2O_3AsC_6H_4NHCOCO_2H.H_2O$, is prepared from arsanilic acid, or its mono-Na salt and $C_2H_2O_4$, at 130–40°; short, microscopic prisms from AcOH (50%), not changed up to 300°. Yield, practically quant. *Alkali salts*, readily sol. With well cooled H_2SO_4 + HNO_3 (d. 1.4) it gives *3-nitroarsanilic acid*, $O_2NC_6H_3(NH_2)AsO_3H_2$; small, yellow, prismatic needles from AcOH (50%), decomp. above 300°. Yield, about 86%. It is sol. in conc. but not in dil. mineral acids and may be diazotized. In pres. of aq. NaOH, Na hyposulfite reduces it to *3,4-diaminophenylarsinic acid*, $(H_2N)_2C_6H_3AsO_3H_2.0.5H_2O$; small, colorless prisms from H_2O, becomes brown above 140°, m. 158–9° (decomp.). Yield, about 64%. The acid is sol. in excess of mineral acids, reduces cold Ag soln. and gives an intense, unstable, dark violet color with dil. HCl + $K_2Cr_2O_7$. It is only $^1/_{20}$ as toxic as atoxyl but is fatal to trypanosomes; it has no therapeutic value because of its action on the nerves. *Aziminophenylarsinic acid*, formula (I) below, is prepared



(I)



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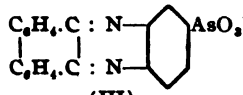
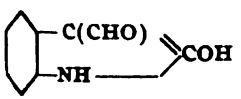


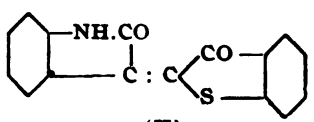
(III)

by diazotizing the preceding compd.; colorless, opaque prisms from AcOH (50%), decomp. above 300°. It is sol. in conc., but not in dil. mineral acids. *o-Phenylenecarbaminoarsinic acid* (*benziminoazolonearsinic acid*) (II), is obtained from 3-aminoarsanilic, NaOH and $COCl_2$; prisms or plates from HCl, not m. 300°. Yield, 76%. *Diphenylenequinoxalinearsinic acid* (*phenanthrophenazinearsinic acid*) (III), from 3-aminoarsanilic acid and phenanthrenequinone; amorphous, not m. 300°. Yield, 89.1%. The acid gives a light yellow color in aq. NaOH and an orange-red in conc. H_2SO_4, or HNO_3 (d. 1.4); the color is discharged and the compd. repptd. on adding H_2O. J. B. T.

Aldehydes of Oxindole, Indoxyl and Hydroxythionaphthene. P. FRIEDLÄNDER AND ST. KIELBASINSKI. *Ber.*, 44, 3098–108; cf. *C. A.*, 4, 2818.—*Hydroxindole-3-aldehyde*, formula (I) below, is formed from alc. NaOH and 2-thionaphthene-3-in-



(I)



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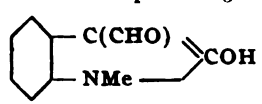

(III)

dolindigo ("thioindigo scarlet R") (II), the other product being thiosalicylic acid, $HSC_6H_3CO_2H$; pale yellow needles from alc., m. 213°. It gives a dark blue color with "iron chloride." *Phenylhydrazone*, pale yellow, stellate needles from C_6H_6, m. 210°. It becomes reddish brown on exposure to light and air; with conc. H_2SO_4 the color is violet. *Aldazine*, orange-yellow needles from glacial AcOH, m. 239°. *Oxime*, warty aggregates from alc., m. 150°. *Oxime hydrochloride* and *sulfate*, cryst. *Anil*, yellow needles from alc., m. 246° (decomp.). The following condensation compds. have also been prepared from (I) and the amines mentioned, *benzidine*, yellow needles from alc., m. above 300°. *p-Toluidine*, greenish yellow plates from C_6H_6, m. 173°. *m-Aminobenzoic acid*, yellow needles, m. above 290°. *p-Phenylenediamine*, yellow

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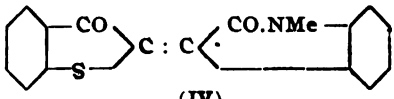
plates, m. above 300°. *N-Methylhydroxindole-3-aldehyde* (III), was prepared from (IV) (see below) and alc. KOH; pale yellow needles from dil. alc., m. 186°. It reduces



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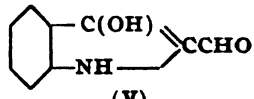
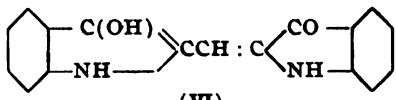


(V)

Ag-NH_3 and gives a brownish black color with "Fe chloride." *Potassium and sodium salts*, cryst. *Phenylhydrazone*, broad, pale yellow needles from C_6H_6 + ligroin, m. 193°. *Oxime*, small, yellow needles from dil. alc., m. 111°. *Aldazine*, orange-yellow needles from glacial AcOH, m. 211°. *Anil*, pale yellow needles from dil. alc., m. 141°. *Benzidine derivative*, greenish yellow needles, m. 218°. *p-Toluidine derivative*, yellow needles, m. 150°. *m-Aminobenzoic acid derivative*, yellow needles from dil. alc., m. 296°. *p-Phenylenediamine derivative*, orange-yellow needles, m. 210° (decomp.). *N*-Methylisatin is best prepared from dil., aq. KOH, Me_2SO_4 and isatin. In presence of dil. alc. NaOH it condenses with hydroxythionaphthene to *N-methylthioindigo scarlet* (IV) (see above); red needles from solvent naphtha. The prep. of indoxyl-2-aldehyde (V) has been described previously. *Acetyl derivative*, $C_{11}H_9O_3N$, colorless needles from ligroin, m. 145°. *Phenylhydrazone*, yellow needles from dil. alc., m. about 116° (decomp.). *Aldazine*, small, orange-red needles decomp. above 150°. *Anil*, orange-yellow needles, m. 195° (decomp.). Warm, aq.-alc. HCl converts (V) into a *dye*, probably, (VI), which could not be purified. *Basic hydrochloride*, $2C_{17}H_{11}$-



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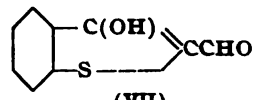
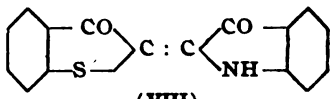


(VII)

O_2N_2.HCl, slender, black-violet needles. In aq. NaOH the color is intensely blue. Chrysanilic acid is also decomp. by HCl into (VI), anthranilic acid and HCO_2H. *3-Hydroxythionaphthene-2-aldehyde* (VII), is formed from 2-indole-2-thionaphthene-indigo (VIII) and conc. alc. KOH; yellow needles from dil. alc., m. 107°. It volatilizes



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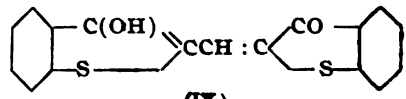
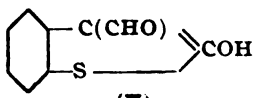
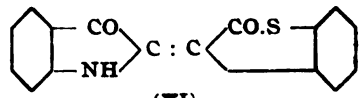


(IX)

slowly with steam, reduces Ag-NH_3 soln. and gives a dark olive-green color with "Fe chloride." *Phenylhydrazone*, broad, golden yellow needles, m. 137°. Alc.-aq. H_2SO_4 converts (VII) into HCO_2H and a *dye* (IX); long, red needles from alc. Yield, about 85% of (VII). *Sodium salt*, $C_{17}H_9O_2S_2Na$, golden lustrous plates. In presence of conc. HCl, 3-hydroxythionaphthene (1 mol.) and (VII) (1 mol.) also form (IX). Yield, almost quant. A similar *compound*, $C_{17}H_9O_2ClS_2$, is produced from (VII) and 6-chloro-hydroxythionaphthene; slender, red needles from solvent naphtha. Bromohydroxy-thionaphthene and (VII) behave analogously. *2-Hydroxythionaphthene-3-aldehyde* (X) is produced from 2-indole-3-thionaphtheneindigo (XI) and b., aq. KOH; white



(X)



(XI)

needles from H_2O, or dil. alc., m. 126–7°. It is volatil with steam, reduces Ag soln. and gives a dark blue color with "Fe chloride" and alc. *Potassium salt*, gray crystals.

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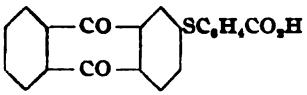
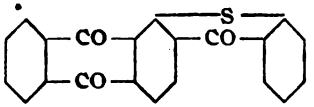
Aldazine, slender, yellow needles, m. 203°. *Anthranilic acid derivative*, slender, yellow crystals, m. 249°. B., dil. mineral acids convert (X) into a yellowish red *substance*.

J. B. T.

Anthraquinonethioxanthones. FRITZ ULLMANN AND ERNST KNECHT. Techn. Chem. Inst. Roy. Techn. Hochsch., Berlin. *Ber.*, **44**, 3125–32.—*Anthraquinone-1-thiosalicylic acid* formula (I) below, is prepared from α-chloroanthraquinone, thiosali-

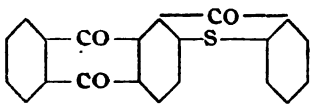


(I)

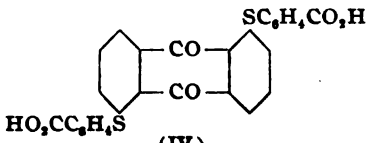


(II)

cylic acid, anhydrous K_2CO_3 and amyl alc., at 145–50°; orange-yellow plates from alc., m. 261° (cor.). Yield, 96%. When b. with $PhNO_2$ and PCl_5 (I) is converted into *anthraquinone-2,1-thioxanthrone* (II); orange-red, lustrous plates, m. 346° (cor.). Yield, 98%. In conc. H_2SO_4 the color is red. Its *vat dye*, prepared from NaOH + Na hyposulfite is blue; this shade is imported to cotton; exposure to air changes the color to bright orange. β-Chloroanthraquinone is best prepared from com. Na anthraquinone-β-sulfonate and Cl. It is converted only slowly into anthraquinone-2-thiosalicylic acid (m. 278° (cor.), not 271°). At 200°, "toluenesulfonyl chloride" condenses it to *anthraquinone-1,2-thioxanthone* (III); small, yellow needles from alc., m. 278° (cor.).

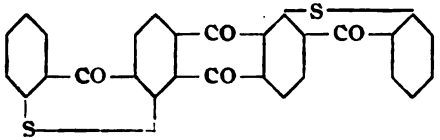


(III)



(IV)

In conc. H_2SO_4 the color is wine-red. Azine, lustrous yellow plates from $PhNH_2$ (see *C. A.*, **4**, 1299). In glacial AcOH the color is yellow, changing to orange with an intense green fluoresence on adding conc. HCl; in b. $PhNO_2$, or $PhNH_2$, orange-yellow; in conc. H_2SO_4, wine-red, strongly violet in transmitted light. *1,5-Dichloroanthraquinone* is prepared from di-K anthraquinone-1,5-disulfonate, $NaClO_3$ and HCl; lemon-yellow needles from toluene, m. 251° (cor.). Yield, 91%. At 150°, in the manner described above, it gives *anthraquinone-1,5-bisthiosalicylic acid* (IV) brick-red needles from $PhNO_2$, m. 349° (cor.). Yield, 97%. In alkalies the color is orange-red; in conc. H_2SO_4 dull, Bordeaux-red. *Potassium salt*, orange-red crystals. When b. with $PhNO_2$ and *p*-toluenesulfonyl chloride (IV) condenses to *anthraquinone-2,1,6,5-bisthioxanthone* (V); lustrous, brick-red plates, not m. 360°. Yield, 83% of (IV). The yield is equally



(V)

good if PCl_5 be used in place of the *p*-toluenesulfonyl chloride. In conc. H_2SO_4 the color is wine-red. The *vat dye* is bluish violet, it dyes cotton the same color, which changes to red on exposure to air. *1,8-Dichloroanthraquinone*, from anthraquinone-1,8-disulfonic acid, is deposited from toluene in yellow needles, m. 202°. It gives *anthraquinone-1,8-bisthiosalicylic acid*; orange-red crystals, m. 279° (cor.). When condensed by *p*-toluenesulfonyl chloride it forms *anthraquinone-2,1,7,8-bisthioxanthrone*

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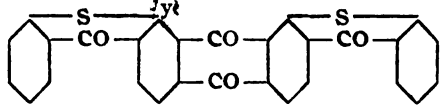
(VI); lustrous, Bordeaux-red needles from $PhNH_2$. In conc. H_2SO_4 the color is violet-



(VI)

red. Its *vat dye* is blue; it imparts the same color to cotton, in air it changes to bluish red. The above results show that the replacement of NH by S (acridone ⟶ thioxanthrone) produces a change in color towards the yellow. J. B. T.

Isomerism and Polymorphism. II. EINAR BIILMANN. Chem. Lab., Univ. Copenhagen. *Ber.*, 44, 3152–7; cf. *C. A.*, 5, 2249.—A reply to Hantzsch (*C. A.*, 5, 3269). The simultaneous production or crystn. of 2 forms from molten material, or from soln. in no way contradicts the assumption of polymorphism. The author's criticism was confined previously to methylphenylpicramide because H. stated that this compd. exhibited homochromisomerism the most clearly. H. has stated that it is impossible to reconcile the assumption of polymorphism with the fact that the higher m. form (128°) of the above amide is the more readily sol. There is, however, no such law. At a given temp., the form which is the more labil dissolves the more readily. It is, therefore, simply a question of the transition temp. as to which form is the more readily sol. At temps. above the transition point one form will dissolve the more readily and at temps. below the transition point the reverse will occur. Stobbe's conclusions (*C. A.*, 6, 91) are also criticized. The cinnamic acids have the same degree of acidity. Polymorphism is much more general than is usually recognized. Methylcumaric acid exists in 2 forms, m. 91–2°, and about 86°, resp. J. B. T.

Autoöxidation of Aliphatic Amino and Hydroxy Compounds. II. WILHELM TRAUBE. Chem. Inst., Univ. Berlin. *Ber.*, 44, 3141–5; cf. *C. A.*, 4, 1741.—The compds. mentioned below were oxidized, at about 70°, by O, in presence of aq. $Ba(OH)_2$ and $Cu(OH)_2$. Glycerol gave $C_2H_2O_4$ (2 mol.), CO_2 (1 mol.) and HCO_2H (1 mol.). Glyceric acid gave $C_2H_2O_4$ and CO_2 in equimol. proportions. Gluconic acid gave CO_2 and $C_2H_2O_4$. Glycollic acid gave $C_2H_2O_4$ and a trace of HCO_2H. Glycocoll gave chiefly $C_2H_2O_4$ and CO_2. Yield, 92 and 8% of the glycocoll, resp. J. B. T.

Oxidation of Amino Acids by means of Alloxan, Isatin and Quinone. W. TRAUBE. Chem. Inst., Univ. Berlin. *Ber.*, 44, 3145–8.—When b. with H_2O and alloxan, in an atm. of N, phenylaminoacetic acid is converted into CO_2, BzH and murexid. Yield, of BzH, 74.3% of the acid. Similar results, both qual. and quant., were obtained from isatin and the acid. With benzoquinone the yield of BzH was 42.9%. Toluquinone acts in a similar manner, but naphthoquinone, anthraquinone, chloroanil and parabanic acid fail to produce any BzH. Benzylamine when b. with isatin, or alloxan also gives BzH. Yield, 65.9 and 34.3%, resp. J. B. T.

Alkylation of Commercial Cyanamine Salts. WILHELM TRAUBE AND ALFRED ENGELHARDT. Chem. Inst., Univ. Berlin. *Ber.*, 44, 3149–52.—Dimethylcyanamine is prepared from com. Na cyanamine (95% Na_2CN_2), MeI and abs. alc. Yield, 60%. The yield of $NHMe_2$ from com. Ca cyanamine (55% $CaCN_2$), Me_2SO_4 and H_2O, is 70–80%. Diethylcyanamine and diisoamylcyanamine are obtained from com. Na_2CN_2 (95%) and EtI, or isoamyl bromide, resp. Yields, 50%. Dibenzylcyanamine was prepared from com. $CaCN_2$ (55%), benzyl chloride and alc. (50%). Yield, 45%. The product from alc. (70%), com. $CaCN_2$ (50%) and benzylchloride, after treatment with HCl at 140°, gave dibenzylamine hydrochloride. Yield, 55%. J. B. T.

Acylation and Alkylation of Cyanamine. OTTO DIELS AND RICHARD GOLLMANN.

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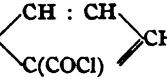
Chem. Inst. Univ. Berlin. *Ber.*, **44**, 3158–65.—*Diethyl cyanaminodicarboxylate*, $NCN(CO_2Et)_2$, is prepared from cyanamine, Et chlorocarbonate and aq. NaOH; long, silky lustrous prisms from MeOH, m. 33°. It has a burning taste. Yield, 100% of the amine. *Dimethyl ester*, from Me chlorocarbonate; small, lustrous, octahedral crystals from alc., m. 96–7°. Yield, 200% of the amine. At 120°, P_4O_{10} converts the above di-Et ester into carbethoxyisocyanate, $OC : NCO_2Et$. *Carbomethoxyisocyanate*, from the di-Me ester; water-clear, insol. liquid, b. 97–8°. *Methyl phenylallophanate*, $PhNHCONHCO_2Me$, from the preceding compd. and $PhNH_2$; long needles from alc., m. 143–4°. At 0°, aq. NH_3 converts di-Et cyanaminodicarboxylate into the *ammonium salt*, $NCN(NH_4)CO_2Et$; white lustrous, octahedral crystals, m. 107–8°. Yield, quant. Dil. HCl (d. 1.08) hydrolyzes di-Et cyanaminodicarboxylate to Et allophanate, but with the conc. acid (d. 7.19) it gives *dicarbethoxycarbamide*, $H_2N\text{-}CON(CO_2Et)_2$; lustrous prisms with a slightly sweet taste from MeOH, m. 86–7°. Yield, 64%. *Dicarbomethoxycarbamide*, is prepared in a similar manner; slender, white needles from MeOH, m. 137–8° (decomp.). Cyanamine, Me_2SO_4 and aq. NaOH give isotrimethylmelamine; with a larger proportion of Me_2SO_4 the product is *dimethylcyanamine*; colorless oil with a characteristic, putrescent odor and an alkaline reaction, b_{14} 52°. It is hydrolyzed by H_2SO_4 (50%) to *asym-dimethylcarbamide*, $H_2NCONMe_2$; large, compact, lustrous prisms from MeOH, m. 181–2°. It has a sweet taste.

J. B. T.

Transformations of α-Pyrrolecarboxylic Acid. Emil Fischer and Donald D. Van Slyke. Chem. Inst., Univ. Berlin. *Ber.*, **44**, 3166–71.—In $CHCl_3$, PCl_5 and α-pyrrolecarboxylic acid give *α-pyrroyl chloride*,  ; long, colorless crystals from dry Et_2O + ligroin, softens and darkens about 110°. Yield, 60–70%. The compds. described below were prepared from this chloride. Methyl ester, from MeOH. Yield, 70%. *Amide*, from NH_3, in Et_2O; white crystals, m. 176.5° (cor.). Yield, about 60%. *Anilide*, $C_{11}H_{10}ON_2$, long, colorless prisms from alc. (30%) m. 153–4° (cor.). *Ethyl α-pyrroylglycinate*, $C_4H_4NCONHCH_2CO_2Et$, from Et glycollate; microscopic plates from C_6H_6, hexagonal plates from H_2O at 0°, m. 118° (cor.). Yield, 76%. It is hydrolyzed by aq. NaOH to *α-pyrroylglycine*, $C_4H_4NCONHCH_2CO_2H$; slender, spindle-shaped crystals from H_2O, m. 167° (cor.). Yield, 60–70%. B. alc. and Na reduces Me pyrroylcarboxylate to a *base*; it volatilizes slowly with steam and gives a ppt. with phosphotungstic acid.

J. B. T.

Action of Sulfurous Acid and of Sulfites on Dyes of Different Classes. Hugo Weil, Karl Dürrschnabel and Paul Landauer. Weil's Chem. Lab., Munich. *Ber.*, **44**, 3172–9; cf. *Ibid.*, **38**, 3492 (1905).—Methylene blue and aq. SO_2 give a *compound*, $C_{32}H_{36}O_8N_6S_6.4.5$ or $5H_2O$; yellow crystals from aq. SO_2. It is fairly stable in air and is oxidized by "bichromate" to a blue *dye*; crystals from H_2O. It dyes wool similar shades to those obtained with methylene blue. The above S deriv. is converted by Ac_2O into a *compound*, $C_{36}H_{39}O_{11}N_6S_6$; greenish very hygroscopic cryst. powder from dil. AcOH. Leucomethylene blue is formed from methylene blue and Na_2SO_3, but with $NaHSO_3$ the product is a *sulfonic acid*, $C_{16}H_{19}O_3N_3S_2.2H_2O$; yellow crystals. Its *dye* imparts greener shades than those of methylene blue. Nitromethylene blue and aq. SO_2 give a *nitroleucomethylene blue sulfonic acid*, $C_{16}H_{18}O_5N_4S_2$; dark brown crystals. It is reduced by Zn dust and dil. HCl to *zinc aminoleucomethylene blue sulfonate*, $C_{32}H_{28}O_6N_6S_4Zn$; yellow crystals. "Meldola's blue" and aq. SO_2 form a *compound*, $C_{15}H_{16}O_4N_2S.1.5H_2O$; almost colorless crystals from aq. SO_2. Phenylindamine and aq. $NaHSO_3$, form a *compound*, $C_{12}H_{18}O_6N_2S_2$; colorless, lustrous plates from H_2O. In a similar manner, *o*-tolylindamine and phenyl-

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o-tolyindamine give the *compounds*, $C_{14}H_{17}O_6N_3S_2$ and $C_{12}H_{15}O_6N_3S_2$, resp. Tetramethylphenylindamine, $NaHSO_3$, SO_2 and H_2O give the *compound*, $C_{16}H_{21}O_3N_3S$. Tolusafranamine and aq. SO_2 form a mixture of sulfite and sulfate. Similar results were obtained with tetramethylphenosaframine, induline B and rhodamine. Tetramethylindamine Zn chloride and aq. $Na_2Cr_2O_7$ give a compound, $(C_{22}H_{22}N_4)_2.ZnCl_4$, which, contrary to statements in the literature, is stable and crystallizes readily. J. B. T.

Reply to Holleman. JUL. OBERMILLER. Inst. Electro and Techn. Chem. Roy. Techn., Hochsch. Stuttgart. *Ber.*, 44, 3179–80.—Holleman's conclusion (*C. A.*, 5, 3820) that *o*- and *p*-orientation depend on an acceleration of the velocity of substitution, whereas *m*-orientation is associated with its retardation, has been anticipated by the author, who showed that the hypothesis is correct (*C. A.*, 5, 1086). Holleman has also adopted other work of the author, without giving any credit, although he was familiar with the author's prior right. J. B. T.

Remarks on the Lecture of May 13, 1911 on "Hydrogenation and Dehydrogenation by means of Catalysis." P. SABATIER. *Ber.*, 44, 3180.—Full credit should be given to Senderens for his share in the conjoint work with the author (see *C. A.*, 5, 3269). J. BISHOP TINGLE.

Ocrein (MORINO-ZUCO, FOA). 11a. Hydrolytic Action of Hydrogen Peroxide (NEUBERG, MIURA). 11a.

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11. BIOLOGICAL CHEMISTRY.

WILLIAM J. GIES.

A. GENERAL.

FRANK P. UNDERHILL.

The Hydrolytic Action of Hydrogen Peroxide. C. NEUBERG AND S. MIURA. Berlin. *Biochem. Z.*, 36, 37–43.—H_2O_2 was tested as to its hydrolytic properties toward large mol. compds. such as proteins, starches, inulin, yeast nucleic acid, chondroitin-sulfuric acid and lecithin. In all cases H_2O_2 manifested in addition to its oxidative, also hydrolytic properties. H_2O_2 may exert an influence in the organism in connection with catalase. LAFORGE.

Swelling and Shrinkage in Isotonic Salt Solution of Frog Muscles after Previous Rest or Activity. CARL SCHWARZ. Vienna. *Biochem. Z.*, 37, 35–46.—When frog's muscles are excized and placed in isotonic salt soln. their wt. gradually increases until it has reached a max. 20–30% greater than the original wt. of the muscles and then appreciably decreases. The nature of the wt. curve is the same, whether the muscle was at rest or active before its excision. The previously active muscle absorbs water much more rapidly than the previously resting one, however. The swelling of the muscles in both cases is attributed to the formation of lactic acid in the tissues. Higher temp., which accelerates the formation of lactic acid, also accelerates the swelling of the muscles. Abundance of O depresses the lactic acid formation and depresses the rate of the swelling. The formation of lactic acid in the active muscle also explains why it swells more rapidly than the resting one when excized and placed in salt soln. When the muscles are placed in hyperisotonic solns., 2 opposing forces are set in action, the lactic acid formation and the osmotic pressure. In solns. of 0.9% conc. or over the osmotic pressure is the more powerful and the muscle shrinks. The similarity of the effect of heat, O, and previous activity in the above phenomena and in rigor supports the hypothesis of von Fuerth, that rigor is caused by swelling of

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e muscles, which in its turn, results from post-mortal formation of lactic acid in em. D. D. VAN SLYKE.

The Constitution of Protein and its Cleavage and Synthesis in the Animal Body. KÖNIG. *Sitzb. Naturhist. Ver. Preuss. Rheinlande u. Westfalens.*, 1910, No. 1 (Sec. C) -12.—Valuable data are summarized. WM. P. GARRETY.

The Tryptic Digestion of Casein M. SIEGFRIED. *Arch. Physiol.* (*Pflüger*), 6, 185–202.—Of the many materials studied, trypsin-casein-peptone yielded the rgest amt. of NH_4OH and the smallest amt. of N material pptd. by phosphotungstic id. WM. P. GARRETY.

Decomposition of Sugars. ADOLF JOLLES. Chem. Mik. Lab., Wien. *Wiener ed. Wochschr.*, 61, 2870–4.—J. holds that the study of the decomp. of carbohydrates very dil. alk. solns. at body temp. will serve as a good basis to clear up the mani- id questions of carbohydrate decomp. in the animal organism. A discussion of the erature is included. P. J. HANZLIK.

Aminoethyl Alcohol, a Product of the Hydrolysis of the "Lecithin" (Phosphatide) f Beans. GEORG TRIER. Agr. chem. Lab. Polytechn., Zürich. *Z. physiol. Chem.*, 3, 383–8.—Among the products of the $Ba(OH)_2$ hydrolysis of lecithin from beans as found $NH_2CH_2CH_2OH$; the fraction yielding it contained $^1/_7$ of the total N of he lecithin. It is probably the mother substance of choline, as $NH_2CH_2CO_2H$ is of etaine. A. HUNTER.

Formation of Proline in the Digestion of Gliadin. EMIL FISCHER AND E. S. LONDON. *Z. physiol. Chem.*, 73, 398–400.—Chyme from a gliadin-fed dog with fistula in the middle of the intestin was kept 8–9 months at 37°, and then dried. The alc.-sol. fraction, freed from fat by soln. in H_2O, was twice esterified at low temp., and the alc. evapd. below 35°. The "proline fraction" of the esters yielded 1.4 g. alc.-sol. amino acids from 50 g. dried chyme = 2.8% crude proline. Of the Cu salts 0.98 g. were sol., 0.62 insol. in EtOH. These yielded resp. 0.19 g. pure *l*-$(C_5H_8O_2N)_2Cu$, and 0.4 g. pure d salt. Another chyme prep., completely hydrolyzed by $Ba(OH)_2$, yielded, on direct extn. with alc. without esterification, a slightly smaller amt. of the Cu salt. All, r almost all, the proline has therefore been liberated by digestion; a fresh argument or its preëxistence in the protein mol. A. HUNTER.

The Enzymes Concerned in the Cleavage of Nucleins, with Special Reference to the Production of Hypoxanthine in the Absence of Adenase. SAMUEL AMBERG AND WALTER JONES. Physiol. chem. Lab., Johns Hopkins Univ. *Z. physiol. Chem.*, 73, 407–15.—Ext. of dog liver converts guanine into xanthine, but has no action on adenine. From thymus or yeast nucleic acid it liberates quant. the H_3PO_4; the purines that appear are xanthine and, not adenine, but the equiv. amt. of hypoxanthine. The latter must, since adenase is absent, have arisen according to the scheme: Adenosine ⟶ inosine ⟶ hypoxanthine. The existence of inosine hydrolase is therefore demonstrated, and at the same time proof is furnished that there are 2 independent nucleases: Purine nuclease, which liberates purine from the nucleic acid mol., and phospho-nuclease, which liberates H_3PO_4, but leaves the purine combined with carbohydrate.

A. HUNTER.

Enzyme Laws. P. v. GRUTZNER. Tübingen. *Arch. ges. Physiol.*, 141, 63–117.—Expts. on pepsin and trypsin show that in a given time the dissolved albumin or gelatin, *ceteris paribus*, is directly proportional to the amt. of active enzyme. Coagulated albumin or solidified gelatin soln. was placed in tubes which were suspended vertically in large amts. of the enzyme soln. The digestion fluid changed but little, the digestion products sinking immediately to the bottom so that the fresh surface of substrate was exposed to the same enzyme soln. With trypsin the digestion occurred at low temp.

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so that destruction of the enzyme was prevented. In expts. where the digestion w interrupted at certain times and its extent detd. for very short periods the amt. of enz and velocity of digestion were proportional. When the digestion period was lon and the small amts. of enzyme larger the activity was diminished. Where giv small amts. of substrate were completely digested, for pepsin, trypsin and ptyalin t velocity was proportional to the enzyme conc. With large amts., especially with pep and less so with ptyalin, the digestion is relatively delayed. In expts. carried t complete digestion with constant amts. of enzyme but varying amts. of substrate, simil relations were observed. For short periods of any expt. the law of Wilhelmy (*Po gendorff's Ann.*, 81, 413 and 499) held with trypsin and pepsin but not with ptyal but for the entire course of the digestion no law was consistently followed.

WALTER A. JACOBS.

Ocrein. F. MARINO-ZUCO AND I. FOA. *Gazz. chim. ital.*, 41, II, 331–6; cf. C *A.*, 4, 3088.—The insol. substance resulting from the action of biotoxin on oxyhem globin, which it is proposed to designate as "ocrein" from its characteristic col has the comp. $C_{288}H_{578}O_{79}N_{70}Fe$; on the H_2O bath, small amts. dissolve in very d NaOH, giving a soln. green by transmitted and red by reflected light and with a spe trum characterized by a red band $\lambda\lambda$ 650–632 and a blue-green band $\lambda\lambda$ 510–490.

CHAS. A. ROUILLER.

Probable Function of Essential Oils and other Volatil Constituents of Plants whic Causes the Movement of the Juices in the Living Tissues. ITALO GIGLIOLI. *Ati accad. Lincei*, 20, II, 349–61.—If thin films of soapy H_2O are exposed to CO_2, volat essential oils., etc., movements and undulations and color changes manifest themselv and the film quickly bursts. Again, when porous substances, such as ashes or sand satd. with H_2O, are exposed to $CHCl_3$ vapors, a part of the water exudes. Similarly in many expts. with different parts of higher and lower plants, it was found that th action, not only of $CHCl_3$, C_6H_6, PhMe and many other artificial substances, but al of a large no. of essential oils and related substances, consisted in augmenting th "juiciness" of the tissues, making the H_2O issue from the cells and the vegetabl juice traverse membranes usually impermeable to this sap. These transudates con sist of a limpid sap containing sugars and other substances, among them enzyme In fact, this is a better method of obtaining zymase from beer yeast than Buchner' or Lebedev's. Cherry laurel leaves, treated in this way, become brown and HCN i evolved. *Cactus opuntia*, kept 21 days under a bell-jar in a $CHCl_3$ atm., lost 20% of its wt. in the form of sap, while in ordinary moist air it lost only 0.25%.

C. A. ROUILLER.

B. METHODS AND APPARATUS.

STANLEY R. BENEDICT.

Antirennin in Exudates and Transudates. V. GALLETTA. Inst. Spez. med. Pathol., Palermo. *Clin. med. ital.*, 50, 143–52; through *Z. Immunität., Ref.*, 4, 670.—A comparative exam. of several methods used in the differentiation of exudates and transudates, leading to the conclusion that the detn. of lipase is of value, but that of amylase and antirennin valueless. H. G. W.

A Simple and Reliable Method for Determination of Ash. KARL STOLTE. Strassburger Univ. Kinder Klinik. *Biochem. Z.*, 35, 104–7.—S. recommends ashing the dried organic material in a Pt vessel of 5 cm. radius and flat bottom placed inside a somewhat larger porcelain dish. Direct contact of the 2 vessels is avoided by means of pieces of porous plate or an inverted crucible lid. F. J. B.

Technic of Hemoglobin Determination. (Change of Hemoglobin into Hematin Hydrochloride). CARL STÄUBLI. Basel-St. Moritz. *Münch. med. Wochschr.*, 46,

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2429–33.—S. studied the darkening of the blood solns. of different hemoglobin contents after various periods of time by the Autenrieth-Königsberger and the Sahli methods and plotted the curves obtained from these results. The longer the period after the withdrawal of the blood and its mixing with 0.1 *N* HCl the colorimetric reading is made, the less influence upon the readings obtained. A definit time interval is essential; 10 minutes is suggested, as the change is very slight after this. The higher diln. by the Sahli method allows less influence of the time factor. The conc. of the acid used is also important, the max. coloration occurring with 0.1 *N* HCl.

H. J. CORPER.

The Detection of Small Amounts of Disaccharides. C. NEUBERG AND SUMIO SANEYOSHI. Berlin. *Biochem. Z.*, 36, 44–55.—Expts. were made with the osazones especially to det. a method for their differentiation. They may easily be isolated even from great diln. and are differentiated by hydrolysis, in the case of maltosazone with yeast enzyme which serves to differentiate it from those which are cleaved only with mineral acids. The other 3 osazones that yield disaccharides were identified after hydrolysis with acids by the physical and chem. properties of the cleaved sugar. By this method a differentiation between lactosazone and melibiosazone is not possible but is seldom required since the one is of animal, the other of vegetable origin. The great advantage of the method is that by the mere appearance of a reduction after hydrolysis the presence of a disaccharide is assured; added to this is the increase in the amt. of material handled owing to the high mol. wt. of the reaction product. No amt. of osazones of monosaccharides can influence the results since these are quite stable towards the agents employed and show no reduction. LA FORGE.

The Detection of Small Quantities of Glucuronic Acid as Osazone. C. NEUBERG AND SUMIO SANEYOSHI. Berlin. *Biochem. Z.*, 36, 56–59.—The osazone of glucuronic acid may be distinguished from all other osazones by its conduct toward naphthoresorcinol and noting the color of the C_6H_6 or $CHCl_3$ extract. Ether should not be employed as it may lead to confusion of glucuronic acid with pentoses owing to the color reaction caused by them under like conditions. The test is made in the usual manner (*i. e.*, b. with HCl + naphthoresorcinol and extracting with C_6H_6). Only glucuronic acid gave the characteristic color. LA FORGE.

A New Ureometer. A. CHAPLET AND M. ROUSSET. *Chimiste*, 2, 321–3.—An app. based on the principle of the ureometers of Esbach, Binet and Thompson, and Senne but simpler than these in having only 1 tube, a 2-way cock, with no rubber connections and no need for a pnuematic trough. Full description of app. is given, with working directions for urin analysis. J. S. GOLDBAUM.

Detection of Blood in Urin by the Filter Method. C. LEEDE. Ependorf. *Med. klinik*, 7, 1817–8.—Clinical. P. J. HANZLIK.

The Estimation of Sugar in Urin. G. A. STUTTERHEIM. Rhoon. *Pharm. Weekblad*, 48, 1201–4.—S. recommends a formula for qual. testing for glucose which resembles Purdy's. V. E. HENDERSON.

Experiments on the Preparation of Pure Invertase. HANS EULER AND SIXTEN KULLBERG. Biochem. Lab. Hochsch. Stockholm. *Z. physiol. Chem.*, 73, 335–44.—One method of prep. was to mix the juice of autolyzed yeast with 1 vol. EtOH, dissolve the ppt. in H_2O, remove protein by the repeated use of kaolin, treat again with 1 vol. EtOH and rub the ppt. quickly with abs. alc.; activity of the prep., $\pm 0° = 25$ min. Or the yeast juice may be treated directly with kaolin, and then with alc.; activity of ppt., $\pm 0° = 20$ min. Crude invertin can sometimes be purified by pptn. with colloidal Fe soln. and extn. with very dil. HCl; an extremely active soln. was obtained in this way ($\pm 0° = 5.6$ min.), but the method often fails and the yield is

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small. For prep. on a large scale it is best to treat the autolytic juice with conc. soln. of $Pb(OAc)_2$, grind with kaolin, filter, grind the Pb-free filtrate with charcoal and kaolin, and ppt. with alc.; yield from 2 kg. pressed yeast 7.7 g. pure white powder; activity, $\pm 0° = 12$ min.; N = 4.65%. The N is probably in the form of amino acids or peptides; it can be reduced to 1.85% by free diffusion against $H_2O + CHCl_3$, the activity being at the same time increased. Detn. of the rate of diffusion indicates a mol. wt. of 27,000. The purest preps. showed complete proportionality between conc. and activity of solns. A. HUNTER.

Determination of Phenols in Cow Urin. P. LIECHTI AND W. MOOSER. Schweiz. agr.-chem. Anstalt, Bern. *Z. physiol. Chem.*, 73, 365–70.—Defence of the authors' method (*C. A.*, 4, 1625) against the criticisms of Neuberg and Hildesheimer (*C. A.*, 5, 3077). A. HUNTER.

Detection of Mercury in Urin. II. E. SALKOWSKI. Chem. Abt. Path. Inst., Univ. Berlin. *Z. physiol. Chem.*, 73, 401–6; cf. *C. A.*, 5, 3292.—The sepn. of Hg from the "end soln." is best effected by warming it with 2–3 strips of polished Cu foil. The Cu is washed, dried, and heated gently in a dry test tube. It is then replaced by a grain of I, and the tube is heated till the vapor of I reaches the upper third. After a time (possibly many hrs.) a red or yellowish deposit of HgI_2 appears on the wall of the tube. Delicacy, 0.25 mg. $HgCl_2$ in 500 cc. urin. A. HUNTER.

Determination of the Amount of Blood by the Injection of Heterologous Serum. JOHANNES SCHURER. Med. Klinik. Heidelberg. *Arch. exp. Path. Pharm.*, 66, 171–8.—The method depends upon the detn. of the diln. of a foreign serum after injection into the animal. 2–4 cc. of a heterologous (beef, horse and human) serum were injected into the ear vein of rabbits and 2–8 min. later about 4 cc. were removed, treated with hirudin and centrifugalized. To inclined test-tubes containing 10 drops of conc. immune serum a layer of the plasma in increasing dilns. was added. The diln. was continued until a faintly visible ring of pptn. was obtained. This was compared with controls made from dilns. of a known mixt. of the serum of the animal and the heterologous serum. The diln. of the foreign serum is thus detd. and from this the quantity of blood in the animal. Only the quantity of blood plasma is directly obtained. In each case the detn. of the vol. of the corpuscles in each unit vol. must be made from which the quantity of blood in the animal can be calc. By the direct use of blood in the prep. of the controlled solns. this trouble can be avoided. The av. of a no. of detns. on rabbits gave 5.66% of the body wt. 5.4 is the av. obtained by various methods by Oerum. The exptal. error lies within 10%. During hunger a relative increase in the quantity of blood was observed. WALTER A. JACOBS.

Toxicological Determination of Aconitine. HERMANN FÜHNER. Pharm. Inst., Univ. Freiburg i/Br. *Arch. exp. Path. Pharm.*, 66, 179–90.—The characteristic action of aconitine upon the isolated frog heart offers a method for its biological detn. With the technic described 0.001 mg. can be detected with certainty. W. A. JACOBS.

Capillary and Adsorption Phenomena with Milk. ALOIS KREIDL AND EMIL LENK. Vienna. *Arch. ges. Physiol.*, 141, 541–58.—Cow milk dropped upon blotting paper of a special variety spreads out in three circular regions, namely, the fat, casein and water zones. In papers having a large ash content this is particularly noticeable. By chem., and microscopic exam. the nature of the 3 zones was detd. In the diln. of 5.3 pts. water, the casein zone is very faint and on further diln. disappears completely. Along with the decrease in the distinctness of the zone limits, a change in the radii occurs so that from the radial relations and the disappearance of the zones upon diln. an approx. idea of the casein or water content of the milk may be obtained. Alkali, acid and rennet cause disappearance of the casein zone. Large amts. of fat may also prevent

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its appearance. Human, dog and cat milk show no distinct casein zone, in the first because of the small amt. of casein present and in the last 2 because of the large fat content. From the velocity of spreading on blotting paper a quant. method for the detn. of fat may be devized. Coagulation occurs more quickly in paper than can be seen under the ultramicroscope. This phenomenon depends upon the increased conc. of the adsorbed casein on the surface of contact of the drop upon the paper.

WALTER A. JACOBS.

So-called Biological Tests for Adrenaline in Blood, with some Observations on Arterial Hypertonus. G. N. STEWART AND H. K. CUSHING. Western Reserve Univ., Cleveland. *J. Exp. Med.*, 14, 377–400.—The combination of a biological test object on which adrenaline causes contraction of smooth muscle (perfused blood-vessels or the uterus) with one on which it produces inhibition of contraction of smooth muscle (intestin) greatly diminishes the chance of error in testing blood or other body fluids for adrenaline. A control expt. with adrenaline soln. should accompany each observation on the blood. With these precautions no evidence was obtained of the presence of adrenaline in detectable amt. in normal blood taken from the general circulation.

WALTER A. JACOBS.

A Method for the Quantitative Determination of Fecal Bacteria. H. A. MATTILL AND P. B. HAWK. Lab. of Physiol. Chem., Univ. Ill., Urbana. *J. Exp. Med.*, 14, 433–44.—A simplified modification of the method of MacNeal, Latzer and Kerr (*J. Infect. Dis.*, 1909, VI, 123) is described. Three successive centrifugalizations are made of a 2 g. sample of fresh feces brought into suspension in 0.2% HCl. The bacterial suspension finally obtained is conc. and extracted with alc., and a Kjeldahl made on the insol. portion. On an absolutely uniform diet of simple, easily digested food during a period of 3–4 weeks, the av. amt. of bacterial N in 2 subjects was 53.9% of the total fecal N. The av. daily amt. of dry bacteria, calc. from the N, is 8.7 g.

WALTER A. JACOBS.

The Technic of Researches on the Respiratory Metabolism of Infants. H. BAHRDT AND F. EDELSTEIN. *Jahrb. Kinderheilk.*, 72, *Ergänzungsheft*, 43–70.—Description of an improved respiration calorimeter for the study of infant metabolism and a discussion of the sources of error in the work.

H. B. LEWIS.

Remarks on Determination of Sugar in the Blood. DENGO TAKAHASHI. Krankenhaus am Urban, Berlin. *Biochem., Z.*, 37, 30–33.—As the result of tests of the respective methods, T. concludes that sugar detns. by the methods of Bertrand and of Kumagawa-Suto agree with each other and with the results of the polarimetric method. The result by Bang's method are always higher.

D. D. VAN SLYKE.

The Determination of Sugars in Natural Substances. CARL NEUBERG AND MIGAKU ISHIDA. Berlin. *Biochem. Z.*, 37, 142–69.—Extracts of natural organic substances are likely to contain optically active impurities which interfere with the polarimetric detn. of the sugar present. Chief among these interfering substances are the proteins and their hydrolytic products. In order to remove these the authors recommend pptn., first with $Hg(OAc)_2$, then with phosphotungstic acid. Each of these precipitants, removes a no. of the amino acids, and also ppts. peptones. Solns. obtained by hydrolyzing casein and gliadin with acid or trypsin are freed from optically active substances by treatment with these precipitants. $Hg(OAc)_2$ in 50% soln. is added until further addition causes no ppt. To the filtrate 25% phosphotungstate soln. is then added in the same manner. The phosphotungstate soln. recommended is made as follows: 200 g. of $Na_2WO_4.2H_2O$ are dissolved in hot H_2O and 5 g. H_3PO_4 are stirred into the soln. 58 g. H_2SO_4 are dild. with 60 cc. H_2O and added to the mixt. which is conc. to 290 cc. The Na_2SO_4 crystallizes out on cooling. The soln.

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is poured off and dild. to double vol. The reagents are added in the mol. proportions $H_3PO_4 + 12Na_2WO_4.2H_2O + 12H_2SO_4$. D. D. VAN SLYKE.

C. BACTERIOLOGY.

ERNEST D. CLARK.

Preparation of Active Yeast Juice by Maceration. A. v. LEBEDEV. *Z. physiol. Chem.*, 73, 447–52; cf. *C. A.*, 5, 1292.—Brewer's yeast is thoroughly washed, pressed, sifted through a 5 mm. sieve, and dried in a thin layer at 25–30°. If 50 g. are macerated with 150 g. H_2O for 2 hrs. at 35° or 6 hrs. at 25°, it yields on filtration a clear juice, free from glycogen, which has greater fermenting power than juice prepd. from the same yeast by Buchner's method. The results from the same prep. are uniform, and comparative expts. can therefore be made at different times. A. HUNTER.

Sugar-free Yeast Fermentation. III. C. NEUBERG AND L. KARCZAG. Berlin. *Biochem. Z.*, 36, 60–7; cf. *C. A.*, 5, 2118, 2495.—In addition to the formation of CO_2 as an indication of the existence of a sugar-free fermentation it was shown by expts. with pyroracemic acid, *d*-tartaric acid and glycerophosphoric acid that there is also a disappearance of the added substances. The authors also failed to confirm the observation of Harden and Paine (*Proc. Chem. Soc.*, 27, 103) that addition of NaCl and $(NH_4)_2SO_4$ soln. increases the autofermentation of yeast. **IV. Carboxylase, a New Enzyme of Yeast.** *Ibid.*, 68–75.—The phenomenon of sugar-free yeast fermentation manifests itself most markedly toward pyroracemic acid, and oxymaleic acid. Since the only gaseous product of the fermentation is CO_2 it was evident that the other product must be present in the soln. By avoiding the use of alkali the authors were able to isolate and identify the last product as acetaldehyde. **V. Carboxylase.** *Ibid.*, 76–81.—General remarks and theoretical considerations on the occurrence and properties of carboxylase with no description of new expts. LA FORGE.

Sugar-free Yeast Fermentations. VI. C. NEUBERG AND L. KARCZAG. Berlin. *Biochem. Z.*, 37, 170–6.—In sugar-free solns. yeast evolves more or less CO_2 from each of the following keto acids: acetonedicarboxylic acid, chelidonic acid, dihydroxytartaric acid, pyrotartaric acid, *p*-hydroxyphenylpyrotartaric acid, phenylglyoxylic acid, and acetylenedicarboxylic acid. Benzoylacetic acid alone gave negative results. Cf. preceding abstr. D. D. VAN SLYKE.

Bacterial Content of Soils (WAITE, SQUIRES). 15. Inhibition of Nitrification by Organic Matter (STEVENS, WITHERS). 15. Fixation of Nitrogen by *B. radicicola* (FRED). 15.

D. BOTANY.

CARL L. ALSBERG.

Alkaloid Content in the Leaves of the Cinchonas. P. VAN LEERSUM. *Proc. Akad. Wetenschappen* (*English*), 13, 210–27.—A new method for extracting these leaves is described. Leaves were split longitudinally, one-half being analyzed immediately; the other was left on the tree and protected from the light either by means of a large box or by wrapping the leaves in tin foil. Analysis of the latter half of the leaf shows that when the leaf is protected from light for 10 days or even a month the alkaloid content of the leaf is unchanged. Hence alkaloids are products of metabolism and not of assimilation as stated by Lotsy, (*Govt. Botanical Gardens Comm.*, 36, 1899). Lotsy is incorrect in stating that the weather affects the formation and migration of alkaloids in the cinchonas. The mesophyll and veins of *C. ledgereania* and *C. succiruba* contain cryst. alkaloids and quinine; their leaf stalks and mid-ribs contain both cinchonine and quinine. STUART J. BATES.

The Action of Methylene Blue on the Respiration and Alcoholic Fermentation

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Living and Killed Plants. VLADIMIR I. PALLADIN, ELISE HÜBBENETT AND MARIE ORSAKOFF. *Biochem. Z.*, 35, 1–18.—Etiolated stem tips of *Vicia faba* colored ith methylene blue give off considerably more CO_2 than do the controls. The tips *Pisum sativum* act similarly but in a lesser degree. The seeds of *Pisum sativum* re similarly affected but still less so. Quinine showed a similar action on the stem ps of both the above plants, but the effect on the seeds of *Pisum sativum* was dif- ent as in this case the respiration was slightly diminished. The difference in chemi- l constitution of the two plants accounts for this difference in action. The richer e object in respiratory chromogen the greater the stimulation by methylene blue d quinine and *vice versa*. The stimulating action of methylene blue on *Vicia faba* ases if the plant is killed by exposing it to a low temp. Further differences be- een the action of methylene blue on aerobic and anaerobic respiration are shown. he ratio CO_2 : alcohol = 1 in the case of seeds treated with methylene blue or qui- ne and < 1 in the controls. Na_2HPO_4 prevents the injurious effects of methylene ue on the etiolated stem tips of *Vicia faba*. F. J. BIRCHARD.

Hypericin (Hypericum Red). C. CERNY. Lab. med. Chem., böhm. Univ., Prag. *. physiol. Chem.*, 73, 371–82.—The 90% alc. ext. of dried blooms of *Hypericum per- oratum*, L. is conc. and pptd. with $Pb(OAc)_2$, and the conc. filtrate treated with 3 ols. Et_2O. From the Pb-free filtrate the pigment is extd. by 1% NaOAc, and is hen obtained in crude amorphous form either by pptn. with HCl or by extn. with cOEt and evapn. When a conc. alc. soln. is treated with a little alc. HCl and (if ecessary) 1/4 vol. H_2O, hypericin, $C_{16}H_{16}O_8$, seps.; microscopic aggregates of needles; ried, a light, glistening, dark violet-red powder; diln. of the mother liquor with H_2O ields more, but in amorphous state. Yield, from 2470 g. dried blooms, 6.6 g. crude igment; from 4.1 g. of the latter, 0.57 g. pure hypericin, of which 0.133 g. cryst. It robably belongs to the flavone group of pigments. Solns. in alc., Et_2O, and AcOEt re blood-red with extraordinarily strong red fluorescence; in conc. H_2SO_4 emerald- reen. The spectroscopic observations of Wolff (*Pharm. Zentralhalle*, 16, 193) are onfirmed; the first band, however, is double, being very dark between λ 605–585, nd less so to λ 570. A. HUNTER.

The Chemical Composition of Pear and Apple Seeds. P. HUBER. *Landw. Vers. Stat.*, 75, 443–61.—The usual analytical detns. were made and protein, lecithin, etc., ere computed. Several compds. were obtained, which were tested by color reactions, tc., but the chem. identity of these was not established. E. C. LATHROP.

The Content of Certain Kernel and Stone Fruit Seeds in Substances Yielding Hydrocyanic Acid Substances. P. HUBER. *Landw. Vers. Stat.*, 75, 462–82.—Three hours' masceration of the seeds with water and distillation of the water ext. gives a onst. amt. of HCN as compared with the detn. by the use of emulsin. About 1/9 of the theoretical HCN split off is changed into formic acid. Pear seeds contain less than 0.0025% amygdalin; apple and pear-quince seeds contain about the same amt., 1.18–1.23%, and stone fruit seeds about 5%. No relation between the total N and the glucoside-yielding HCN could be detd. E. C. LATHROP.

Formation of Alkaloids in Tobacco. C. RAVENNA AND V. BABINI. Lab. chim. agar. r. univ., Bologna. *Atti accad. Lincei*, 20, II, 393–8; cf. *C. A.*, 5, 3466.—The expts. of Ravenna and Peli on *Sorghum vulgare* (*Gass. chim. ital.*, 37, II, 586) were repeated with tobacco plants. Starting with plants containing 0.057% nicotine (re- ferred to the wt. of the green material), those immersed in a nutritive soln. con- taining nitrates and glucose and kept in the light were found to contain 0.172%; with nitrates alone in the light, 0.117; without nitrates in the light, 0.113; with ni- trates in the dark, 0.110; with nitrates and glucose in the dark, 0.085.

CHAS. A. ROUILLER.

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Presence of Glycogen in Phanerogams and its Relation to Calcium Oxalate. Ioannes Politis. Ist. bot. r. univ. Pavia. *Atti accad. Lincei*, 20, II, 431–9.—Glycogen was found in *Orchis morio*, Linn., *Bletia hyacinthina*, Ait., *Bilbergia nutans*, Wend. and *Pitcairnia xanthocalyx*, Mart. The mucilage of *Orchis* tubers behaves like glycogen, not like cellulose as generally supposed. The glycogen in the phanerogams studied is formed only in cells containing raphides, and there exists a relation between it and Ca oxalate, as it is always formed in cells in which Ca oxalate later appears in the form of raphides. Chas. A. Rouiller.

E. NUTRITOIN.

PHILIP B. HAWK.

NORMAL.

The Relation of Nitrogen to Sulfur in Metabolism. Gross. *Z. exp. Path.* 9, 171.—Under normal conditions the ratio of N to S in the intake is followed closely by the same ratio in the excreta. In starvation the output of S tends to remain const. while the N decreases. The S-rich proteins or cleavage products thus appear to be utilized first during starvation. Lecithin fed shows no sparing of the protein. H. C. Bradley.

Pancreatic Diastase and Various Starches. Nagao. Strassburg i. Els. *Z. exp. Path.*, 9, 227.—Wheat and rye starches are hydrolyzed at equal rates by pancreatic diastase. Oat and barley starches are digested at about the same rate, and much more rapidly than wheat and rye. H. C. Bradley.

The Influences of the Food Substances of Human Milk on the Intestinal Flora of Infants. H. Bahrdt and H. Beifeld. *Jahrb. Kinderheilk.*, 72, (*Ergänzungsheft*) 71–93.—The digestion of human and cow milk in normal infants differed in the fact that with human milk fermentation processes predominated in the intestin, while with cow milk putrefaction occurred largely. The constituents of the curd, particularly the casein, may have an antagonistic effect on the acidophile bacteria. In cow milk the greater Ca content of the milk and curd may work against the acidophile bacteria by salt formation with the acids. The effect of lactose on the acidophile bacteria can be only indirect. The lactose permits fermentation in the small intestin for coli and lactic acid bacilli until an inhibitory degree of acidity is reached and the acidophiles take predominance. The predominance of *B. bifidus* and the other acidophiles is therefore an expression of the fact that the intestinal contents at the end of digestion have attained a certain degree of acidity, which can only arise from a relatively higher sugar content (and lesser Ca content?) of the food. H. B. Lewis.

The Determination of the Energy Requirements in the Food of Infants. O. Heubner and W. Heubner. *Jahrb. Kinderheilk.*, 72, 121–48.—The energy quotient and growth of a normal child were studied for the first 172 days of its life. During the first 30 days the food consisted entirely of mother's milk; from the 31st to 42nd day of $^2/_3$ mother's milk and $^1/_3$ of a mixt. of 1 part cow's milk to 2 parts of a 7.5% lactose soln.; 43–136th day $^1/_2$ mother's milk and $^1/_2$ of a mixt. of equal parts of cow's milk and 10% lactose soln.; 137–162nd day on the same diet with the addition of 2.5% corn meal; 162–172nd day on the artificial food alone. The analysis of mother's milk showed that previous calorific values of 650 cal. per l. for human milk were too low, a value of 772–830 cal. being obtained. During the first 30 days even with an energy quotient of 90–120 cals., there was no growth due to lack of sufficient water in the diet. The energy requirements of growing infants may lie higher than 100 cals., but no lower. H. B. Lewis.

The Amount of Blood and Hemoglobin and the Oxygen Capacity of the Blood in

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Normal and Anemic Appearing Children. E. MULLER. *Jahrb. Kinderheilk.*, 72, *Ergänzungsheft*, 176–208.—The amt. of blood in children from 6–12 yrs. of age was 6.78% of body wt. (higher than in adults). From 6–10 yrs. the value was 6.97%. The sp. gr. was 1.0435 (higher than in adults). The % hemoglobin content was lower than in adults, averaging 12.1 g. per 100 cc. blood (Fleischl-Miescher). The total hemoglobin was 0.8% of body wt., (higher than for adults due to the greater amt. of blood). The % O capacity was less (15.6%) than in adults (19.8%). The sp. O capacity of the hemoglobin varied between 0.95 and 2.07 cc. per g. hemoglobin, with a mean of 1.31 cc. Between normal and anemic appearing children there were no differences in the amt. of blood, hemoglobin, etc., which could explain the anemic appearance. It is suggested that in such cases there may be a failure of the tissue cells to take sufficient O from the blood. H. B. LEWIS.

The Value of the Albumin Content of Human Milk. P. GROSSER. Kinderklin. stadtl. Krankenh., Frankfurt. *Jahrb. Kinderheilk.*, 73, 101–7.—Goats were fed on a mixt. of free whey from goat milk, casein, and fat of goat milk. In spite of the fact that they received no glycocoll group in their protein, hippuric acid was found in the urin after feeding BzOH. Infants showed growth on a mixt. of protein-free whey from human milk, casein, and fat of cow milk, but on a return to a diet of cow milk alone they showed a loss of wt. This seemed to show that the favorable effects of human milk on infants depended neither on its protein content in general nor its albumin in particular. H. B. LEWIS.

Further Studies on the Decomposition of Meal. M. KLOTZ. *Jahrb. Kinderheilk.*, 73, 391–420.—The amt. of fecal bacteria in infants as detd. by the Strassburger method was dependent on the carbohydrate intake, since addition of meal and sugar resulted in an increase. Fermentation expts. showed that the acid formation was greater with oat meal than with wheat meal. The max. content of bacteria in the dried feces was 30–36%. H. B. LEWIS.

The Influence of Moderate Changes in Atmospheric Temperature on the Respiratory Metabolism of Infants. A. SCHLOSSMANN AND H. MURSCHHAUSER. Kinderklinik, Duesseldorf. *Biochem. Z.*, 37, 1–22.—The influence was *nil*. D. D. VAN SLYKE.

Studies on the Comparative Physiology of Digestion. III. The Association of Microörganisms, Bacteria and Infusoria in the Digestive Tract of Cricetus frumentarius. ARTHUR SCHEUNERT. Physiol. Inst. tierärztl. Hochsch., Dresden. *Arch. ges. Physiol.*, 141, 441–56.—The intestinal flora of the hamster are as a whole identical with those of other animals, especially herbivorous animals. As obligatory intestinal bacteria, *B. coli commune*, *B. lactis aerog.* and in a few divisions putrefactive anaerobes occur. In addition *B. guntheri*, particularly in the proximal portions of the tract, and also infusoria were observed. WALTER A. JACOBS.

ABNORMAL.

The Degradation of Carboxylic Acids in the Animal Body. XIV. The Removal of Hydrogen from the Animal Body. E. FRIEDMANN. Berlin. *Biochem. Z.*, 35, 49–56.—A number of substances with a high H content such as cyclohexanecarboxylic acid, hexahydroanthranilic acid, cyclohexaneacetic acid and cyclohexanol acetic acid were given to dogs, and the amt. of hippuric acid excreted in the urin detd. Only the first two acids caused a decided increase in the amt. of hippuric acid eliminated. A detailed method for the isolation of hippuric acid from the urin is given. F. J. B.

Diabetic Acidosis and the Influence of "Oatmeal Cures" upon it. H. JASTROWITZ AND H. BEUTTENMULLER. Med. Poliklinik, Halle a/S. *Z. exp. Path. Ther.*, 9, 365–81.—In the 3 cases studied, the excretion of glucose in the urin, on the oatmeal days, was less than the carbohydrate intake. The favorable action of the oatmeal diet

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was not always observed on a repetition of the "cure", nor did it depend on the severity of the disease. In spite of large doses of Na_2CO_3 and the oatmeal diet, acetone substances, though greatly diminished in amt., did not disappear from the urin. Some observations show a high NH_3 content in the urin, not to be explained by the acidosis; also a high % of N substances pptd. by phosphotungstic acid. On an oatmeal diet, there is a retention of glucose in the blood. I. GREENWALD.

Destruction and Formation of Uric Acid. VII. G. IZAR. Inst. spez. Path. Inn. Krankhtn., K. Univ. Catania. *Z. physiol. Chem.*, **73**, 317–334; cf. *C. A.*, **4**, 2310.—(*I*). *Absence of Uric Acid Regeneration in Fasting Animals:* Liver exts. from fasting dogs not only have relatively feeble uricolytic power, but are unable to regenerate more than a trace of the uric acid destroyed. Their activity in the latter respect is increased by blood from a recently fed, but not by blood from a fasting animal. In starvation the regenerating enzyme gradually disappears from the blood, while the co-enzyme of the liver is not affected. (*II*). *Destruction and Formation of Uric Acid in Birds:* Liver ext. from fowl, goose or turkey is able to destroy uric acid. The liver of birds killed 2 hrs. after a meal regenerates, in the absence of O, the uric acid which has disappeared; as with mammals resynthesis depends on the combined action of a thermolabil enzyme in the blood and a thermostable co-enzyme, sol. in alc., present in liver but not in kidney. Uric acid destroyed by liver ext. from a fasting fowl is regenerated on addition of blood from a well fed dog and *vice versa*. (*III*). *Uric Acid Synthesis in Mammals and Birds:* A soln. of 1 g. dialuric acid and 0.5 g. urea in blood + Ringer's soln., satd. with CO_2, was circulated in 2 expts. through dog liver. After 30 min. the fluid contained 127.8 and 162.0 mg. resp. of uric acid; after 60 min. longer, 972.8 and 386.8 mg. Preliminary blank expts. yielded 18.9 and 17.3 mg. in 30 min. Synthesis of uric acid by the action of liver ext. on dialuric acid + urea follows in dog and bird the same laws as the regeneration of uric acid. The liver of dog or bird, whether as ext. or in artificial circulation, cannot produce uric acid from urea with $MeCH(OH)CO_2H$, $CH(OH)(CO_2H)_2$, $CH_2 : CHCO_2H$, $C(OH)_2(CO_2H)_2$, or $C_2H_2O_4$; but some is produced by bird liver from urea + $(NH_4)_2CO_3$. A. HUNTER.

The Rate of Decomposition of Food and Tissue Protein. H. v. HOESSLIN AND E. J. LESSER. Lab. stadt. Krankenanstalten, Mannheim, and med. Klin. Univ. Halle. *Z. physiol. Chem.*, **73**, 345–64.—The expts. of Michaud (*C. A.*, **4**, 341) are criticized. They do not settle the question whether the increased breakdown of protein, which follows administration of the hunger minimum, depends chiefly on chem. differences between food and tissue proteins, or rather on alterations in conc. of the decomposable material. The subject of the present expt. was a female dog of 20–25 kg. Each day's urin was collected in 2 periods of 11 and 13 hrs. There were 4 food periods of 2 days each, preceded and sepd. by 3–4-day periods of starvation. The N fed was always the same, 4.52 g. daily, being slightly in excess of the loss during starvation, 4.47 g. In the 1st 2 periods it was given in the form of powdered dog flesh, in the last 2 powdered horse flesh; in one of each pair it was administered in a single meal, in the other in 6 equal and equally distributed fractions. With 6 meals the N excretion was 5.35 g. on dog flesh, 5.18 g. on horse flesh, and the differences between N of day and night urins was only 2–3%. With one meal the N loss was 6.08 g. (dog), and 5.98 g. (horse), while the day excretion was 40% greater than the night. No difference was observed between horse and dog protein, and in no case was N equil. attained. In another expt. administration of 4.98 g. N in 12 equal portions of horse flesh raised the excretion of N from 4.77 to 5.91 g.; the same in one meal, 6.46 g.; the same, as dog flesh in 1 meal, 5.85 g. The difference here exhibited between dog and horse flesh may depend on chem. differences. But in all cases the decomp. of protein is stimulated.

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s is to be attributed chiefly to alteration through feeding of the conc. of protein ts derivs. at those points in the cell or organism where its decomp. takes place; alteration of conc. is the same whether the protein fed be of the same species or ther. Herein lies the explanation of the so-called "luxus consumption" of protein. A. HUNTER

The Feeding of Phosphorized Cod Liver Oil with Calcium Salts in Rachitis. I. SHABAD. Lab. St. Peter-Paul-Hospit., St. Petersburg. *Jahrb. Kinderheilk.*, 1-17; cf. *C. A.*, 3, 1435, 1783; 4, 2855; 5, 935, 3109.—In the use of phosphorized liver oil in rachitis, the particular salt of Ca fed with it caused marked differences the Ca retention. While Ca acetate was retained in large degree (20–60%) by the anism, the citrate and phosphate of Ca were not retained. The P retention cor-ponded to the Ca retention. Ca acetate increased the retention of P of the food, le the Ca salts which were not retained diminished the P retention. The addition Ca salts increased the N content of the feces and diminished the N absorption, al-ugh the N retention was increased due to the marked decrease in urinary N. The dition of Ca salts also diminished the fat absorption, the citrate and the phosphate re than the acetate. This decrease in absorption could not be explained by an in-ased soap formation. A diminished fat cleavage corresponding to the decreased rption was found. The decreased absorption could not be entirely due to de-ased cleavage of fat since the abs. amt. of fatty acids in the feces was greater in the expts. than in those without Ca salts. H. B. LEWIS.

The Fate of Fat in the Intestin of Infants under Normal and Pathological Con-ions. S. USUKI *Jahrb. Kinderheilk.*, 72, 18–52.—After the use of malt ext. with k in the diet of infants, the stools showed a higher % of dry substance and a lower of fat after the use of gruels or meal with the milk. The av. fat elimination in the ols was 13–13.5% of the intake. The acid reaction of the stools after feeding malt indicated an unfavorable utilization of the fat. Homogenized milk possessed advantages as to fat utilization or soap formation. A relative and abs. decrease the soap elimination resulted from the use of malt ext., together with an altera-n of the alk. reaction and consistency of the feces and the clinical symptoms. The ct of the malt ext. was not due to maltose since maltose fed in amts. correspond-to the maltose content of the ext. gave soapy stools. The alkali soaps were pres-in the stools in amts. of 10% or less. The alkali soaps were not increased in diar-a. The amt. of neutral fat averaged 10%, and was greater in the acid stools in in soapy stools. In the cases studied an av. of 1% of the fat intake escaped the stools unsaponified. In increased peristalsis of nervous origin, the fat splitting s somewhat lessened, but the fat absorption was normal. In diarrhea with acid ols fat absorption was also lessened. The stools after feeding malt ext. contained out 3.5 times as much carbohydrate as did the stools after maltose feeding. It uggested that the more difficultly absorbed malt ext. remains in the lower intestin, il by fermentation of its carbohydrates checks soap formation. Diarrhea more ickly affected carbohydrate absorption than fat absorption. The metabolism the alk. earths was independent of the soap formation. More cholesterol was nd in acid stools than in soapy stools. H. B. LEWIS.

The Amino Acid Fraction in the Urin of Infants. F. W. SCHULTZ. *Jahrb. Kinder-lk.*, 72, (*Ergänzungsheft*), 94–106.—A part of the N of the urin of infants was present amino acid N. Isolation of the amino acid could not be accomplished. The % amino acid N in the same child on a uniform diet was nearly const. In 1 abnormal e feeding of alanine resulted in an abs. and relative increase in the amino acid N the urin. H. B. LEWIS.

The Disturbances of the Water Content of the Body (Salznährschaden) in Infants.

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N. KRASNOGORSKI. Univ. Kinderklin., Breslau. *Jahrb. Kinderheilk.*, 72, 373–88.—Clinical edema could result without an increased salt retention in cases of a decrease mineral balance. Children in whom a diet rich in salts produced edema retained th salts in smaller amts. than normal children, indicating a decreased salt retention. A an effect of NaCl introduced with the mother's milk, the Ca-, Mg-, and KCl-retentio were increased, while the NaCl in spite of the edema was almost completely eliminate The elimination of salts by the kidney in children with edema was normal. H. B. L.

The Nitrogen and Sulfur Metabolism in Cases of Rachitic Dwarfing and a Contribution to the Normal Metabolism of a Five-year Old Boy. H. SCHWARZ. Mt. Sin Hospit. and Lab. Cornell Med. College, New York. *Jahrb. Kinderheilk.*, 72, 549–7 712–35.—Complete analysis of the urin, feces and food of a normal 5-yr. old boy an 3 cases of rachitic underdevelopment were made for a period of 7 days. In 2 of th abnormal cases creatine was found in the urin in amts. equal to or greater than th creatinine. This was probably due to the diminished activity of the liver and th condition of the musclar system, since in the 3rd abnormal case where the size of th liver and the musculature was normal, no creatine was found. The S content of th feces in the abnormal cases was greatly increased. H. B. L.

Studies on Mineral Metabolism. H. KOEPPE. Giessen. *Jahrb. Kinderheilk* 73, 9–49.—Water retention in infants who had suffered from nutritive disturbance was to be considered favorably as a reparation for a previous lack of water. In 1–1 day fevers in well nourished infants, there was an increase in wt. due to a water retention. In bottle fed infants the P elimination in the urin was dependent on the amt and nature of the food. The addition of NaCl to the diet caused a marked increas in P elimination, an increased temp., and an increase in wt., pointing to a Cl retentio H. B. LEWIS.

The Water Content of the Blood and its Relation to the Nutritive Disorders of Infants. F. LUST. Univ. Kinderklin., Heidelberg. *Jahrb. Kinderheilk.*, 73, 85–100, 179–214.—The blood of infants had an av. water content of 82%, 3–4% higher than the blood of older children or adults, except in the first few wks. of life when the water content was lower than in adults. Breast fed infants in general had a lower water content of the blood than infants on artificial food. During the first few wks. of growth the curves of growth and water content of the blood ran nearly parallel. The curves remained parallel till the blood attained its physiological conc. In chronic nutritive disorders, the water content of the blood showed no variation from the normal. An increased salt intake even when it produced an edema, caused in some cases a hydremia and in some cases no change. At the end of edema, there resulted a hydremia as long as the excess water of the tissues could return to the blood stream. H. B. LEWIS.

Masses of Casein in the Feces of Children. F. B. TALBOT. Abt. Serumdiagn., Harvard Med. School. *Jahrb. Kinderheilk.*, 73, 159–63.—A sp. precipitin for casein of cow milk was developed in rabbits. The gummy masses found in children's feces gave the same precipitin reaction with anticasein serum as did casein of cow milk. The normal feces of children fed on cow milk gave no reaction. H. B. L.

The Fat Content of the Feces of Infants with some other Observations. H. SAITO. Kinderklin. Kaiserl. Univ., Tokio. *Jahrb. Kinderheilk.*, 73, (*Ergänzungsheft*), 222–51.—The fat content of the feces of infants on natural or artificial diets was nearly const., 20% of the dried feces. Fat absorption was about 96%. In new-born children the fat content of the feces was as high as 40% in some instances. A higher content was observed in dyspepsia. The feces of the new born or of dyspeptic children were rich in oleic acid. The content of cholesterol and other unsaponifiable substances was 0.03% of the dried substance. H. B. LEWIS.

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The Amino Acid Content of the Urin of Children and Infants. R. HADLICH AND GROSSER. Kinderklin. stadtl. Krankenh. Frankfurt. *Jahrb. Kinderheilk.*, 421–9.—The amino acid content of the urin of older children, corresponding hat of adults, was not influenced by fever, but was increased in severe cases of eritis. In infants the amino acid content was generally increased, but was inde- dent of the condition of the child, the diet, and the character of the stools, with exception of cases of alimentary intoxication in which the content was increased. s confirmed the earlier theories that acute intoxication represents a disturbance he oxidizing power of the organism, since the presence of amino acids in urin results n an inability to split off NH_3 and synthesize urea. H. B. LEWIS.

The Effect of Crying on the Respiratory Metabolism of Infants. A. SCHLOSSMANN D H. MURSCHHAUSER. Kinderklinik, Duesseldorf. *Biochem. Z.*, **37**, 23–9.—When et, a child consumed per hr., per sq. m. body surface, 10.86 g. O and the CO_2 ex- tion was 12.12 g. When the child cried most of the time, these values increased 15.64 and 19.32 g. The respiratory coeff. in the quiet period was 0.84; during ing it rose to 0.90. This indicates an increased consumption of glycogen and fat the body, and makes it appear improbable that more protein was burned as the ult of the exertion. D. D. VAN SLYKE.

The Fat Content of Dog Blood under Normal and under Different Experimental nditions (Digestion, Starvation and Phosphorus, Phlorhizin and Chloroform Poisoning). ONE LATTES. Inst. f. gerichtl. Med. Univ. Turin. *Arch. exp. Path. Pharm.*, **66**, -42.—The normal petroleum ether extract (higher fatty acids and cholesterol d. in the blood of the normal dog by the method of Kumagawa-Suto (*Biochem.* 8, 212)) amts. to 0.3–0.42% and appears to be somewhat higher in venous than arterial blood. During the absorption of a diet rich in fat, particularly milk, the content of the blood nearly doubles itself. An increase of this ext. can appear phlorhizin and in P poisoning. In starvation of short duration a slight increase curred; when of long duration no increase was observed. In $CHCl_3$ anesthesia, n when of long duration no increase in the petroleum ether extract was observed. WALTER A. JACOBS.

The Spleen and Digestion by the Stomach and the Alleged Pepsin Content of the leen. GEORG TRAMPEDACH. Evangelisches Krankenh., Köln-Kalk. *Arch. ges. ysiol.*, **141**, 591–616.—In a variety of expts. T. found in direct opposition to Tarulli d Paskucci (Luciani's, *Lehrbuch d. Physiologie d. Menschen*), that extirpation of the leen did not diminish the digestive activity of the stomach. Following extirpation mphocytosis occurred. No parallelism, however, existed between this and the secre- on of pepsin. The infusion of the hyperemic and swollen spleens of dogs killed after rge meals contained no pepsin or pepsinogen. The power of the acidified infusion dissolve N from blood fibrin is attributable to the acid added. The observed diminu- on of the vol. of fibrin immersed in the infusion is due mostly to a shrinkage of the brin and not to proteolysis. W. A. J.

The Sugar Content of the Blood in Addison's Disease. SIEGMUND BERNSTEIN. Med. Klin., Univ. Wien. *Ber. klin. Wochschr.*, **40**, 1794–6.—The sugar content the blood in 4 cases of Addison's disease showed in 3 of these cases a hypoglycemia. he cachexia does not explain this hypoglycemia as a hyperglycemia exists in some chectic conditions (pulmonary tuberculosis, etc.). H. J. CORPER.

Metabolism Studies in a Case of Diabetes Insipidus. H. W. GOODALL. Harvard ed. School. *Boston Med. Surg. J.*, **165**, 788–91.—On meat diet an excessive pro- rtion of the ingested fluid was eliminated through the kidney, but not when on pro- in-free diet. There was little disturbance in N metabolism, urea being somewhat

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low, rather than high as formerly believed characteristic of diabetes insipidus. Inositol was not found, but creatine was always present. Polydipsia seems to be the probable primary cause in this case, and the increased katabolism of body protein is the result of under nourishment rather than the increased water intake. H. G. W.

Pigmentary Anomalies of Metabolism. OSKAR ADLER. Med. Klinik Deut. Univ., Prague. *Z. Krebsfrsch.*, 11, 1–43.—From the urin of an alkaptonuric was obtained about 12 g. homogentisic acid daily. The ratio of homogentisic acid to total N of urin was nearly (const. about 42 : 100). From this homogentisic acid obtained by action of alkalies a pigment which A. calls alkapton-black, as Na salt. The free acid of this salt contains C, 55.13; H, 4.5; O, 40.37%. The properties of this substance were studied and described. It resembles tumor melanin and similar substances in not being bleached by common reducing agents. Substances similar to alkapton-black can be obtained also from gentisinic (hydrochinonone carboxylic) acid by action of alkalies. Injected into mice in 40 mg. doses caused death, but same dose in rat was survived and urin contained pigment. By partial oxidation of phenol A. obtained substances of same melanotic type. By working up 15 l. of mixed urins from patients without alkoptonuria A. obtained material giving reactions suggestive of presence of homogentisic acid, but not enough of this to identify positively. A. gives a new method for detecting melanin in urin which is very delicate and reliable: Acidify 100 cc. urin with a drop of AcOH, ppt. with $Pb(OAc)_2$ (neutral), filter with suction, wash with dil. $Pb(OAc)_2$ soln., suspend ppt. in water and decomp. with H_2S. To 2 cc. of filtrate, add a drop of dil. $FeCl_3$ soln., 3 cc. glacial AcOH, and 1–2 cc. conc. H_2SO_4; metallic violet color, spectroscopically sharp band near D line (λ = 568–595$\mu\mu$). This can be used when there is very little melanin in urin, by taking 20 cm. tube and Nernst lamp. Most closely approached by tryptophane and indole. Tyrosine and tryptophane give upon oxidizing with PbO_2 dark pigments resembling melanins, designated as tyrosine-black and tryptophane-black. Tyrosine-black is toxic to rats and mice; excreted in urin and bowels. H. G. W.

F. PHYSIOLOGY.

ANDREW HUNTER.

The Composition of the Heart of Man and Dog. RICHARD LEDERER AND KARL STOLTE. Univ. Kinder Klinik, Strassburg. *Biochem. Z.*, 35, 108–12.—Determinations of the amt. of H_2O, ether extractable substance, glycogen, KCl + NaCl, Na, K, Cl, P, S, N and total ash were made. The human heart contains more Na, Cl and S than dog heart but less P and N. No differences in comp. between normal and pathological hearts could be detected. F. J. B.

Antipneumin. F. BATTELLI AND L. STERN. Physiol. Inst., Univ. Genf. *Biochem. Z.*, 36, 114–43; cf. *C. A.*, 5, 2661.—Antipneumin is found in various tissues of the body and possesses the power of diminishing the intensity of the main respiration ("Hauptatmung"). The muscles and the heart contain only a very small amt., while all the other organs possess considerable quantities, particularly the spleen. It could not be found in the blood. It may easily be prepared in the form of a powder which retains its activity for a long period of time. Dissolved in H_2O antipneumin is destroyed by heating to 65°, also by acids and alkalies of moderate conc., and by treating with alc. or acetone. It can, however, withstand the action of pepsin. It cannot be dialyzed. It does not digest fibrin. Its power is weakened by the action of the blood and of phosphate solns. If the conc. of the phosphate soln. be increased the amt. of antipneumin must also be increased in order to diminish the intensity of the main respiration. The antipneumin administered to the tissues works indirectly so that the decrease is only noticed after several mins. The action of antipneumin upon the

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tissues appears to be a reversible one, at least if the time of contact is short. Antipneumin and pnein exert an antagonistic action on the intensity of the total respiration, both as regards the absorption of O and development of CO_2, although no direct antagonism exists between these 2 substances. F. J. BIRCHARD.

The Histochemistry of Spermatozoa. II. H. STEUDEL. Physiol. Inst., Univ. Berlin. *Z. physiol. Chem.*, **73**, 471–7; cf. *C. A.*, **5**, 3468.—The spermatozoon heads of the herring, washed with H_2O, EtOH and Et_2O, consist essentially of protamine and nucleic acid; for on acid hydrolysis they yield 21.64% arginine = 22.28% protamine; calc. 28.19%. The deficit (5.9%) compares with that found in the detn. of nucleic acid (6.4%). The NH_3 arizing during hydrolysis (2.96% of total N) comes from the nucleic acid. On the other hand preps. made by pptg. the fresh spermatozoa with AcOH contain considerable amts. of protein; P and N are only 3.6 and 17.8%, resp. When, as in the Neumann method for nucleic acid, spermatozoa are dissolved in hot NaOH soln., 7.2–7.7% of the N is liberated as NH_3; this comes from the protamine, and the liquid contains ornithine in place of arginine. A. HUNTER.

The Uniformity of the Casein of Human Milk. L. LANGSTEIN AND F. EDELSTEIN. *Jahrb. Kinderheilk.*, **72**, (*Ergänzungsheft*), 1–15.—Casein from human milk prepared by various processes was of uniform comp. and always had a lower P content (0.22–0.28%) than casein from cow's milk (0.85–0.87%), proving that these 2 kinds of casein were different compds., although the difference might be merely quant. Pure casein from human milk gave no trace of color in the Molisch test for sugar, and was not altered in its properties by repeated soln. and pptn. H. B. LEWIS.

The Calcium Content of Human Milk. H. BAHRDT AND F. EDELSTEIN. *Jahrb. Kinderheilk.*, **72**, (*Ergänzungsheft*), 16–42.—A large number of analyses of human milk showed wide individual variations in the Ca content, 0.03–0.08% with a mean of 0.042% CaO. The daily variations amounted to as much as 0.01–0.02% in the same individual and were greater than those found by Hunaeus (cf. *C. A.*, **4**, 476). The Ca content decreased with the increased period of lactation. No increase in the Ca content of the milk was found even after feeding $CaCO_3$ or Ca lactate for a 3-month period. In a case of anemia of mother and child there was no decrease in the Ca content of the milk. H. B. LEWIS.

Viscosimetric Studies. J. TRUMPP. Univ.-Kinderklin., Munich. *Jahrb. Kinderheilk.*, **73**, (*Ergänzungsheft*), 89–151.—Measures of the viscosity of the blood were made by the method of Hess. The viscosities of serum and washed erythrocytes were 40–50 and 60–70% resp. of the viscosity of the total blood. Defibrinated blood had practically the same viscosity as whole blood. The role of the fat, stroma, and fibrin in the viscosity was slight. No parallelism was found between viscosity and coagulability. The colloidal content of the plasma influenced the viscosity. After exposure to CO_2 the viscosity was increased, due to an increase in cell colloids from the erythrocytes. In hemolyzed blood the viscosity was increased. In normal children, the viscosity of the blood was higher than in adults. H. B. LEWIS.

Blood Pressure in Childhood. O. SALLE. Univ.-Kinderpoliklin., Berlin. *Jahrb. Kinderheilk.*, **73**, 273–83. H. B. LEWIS.

Reaction of the Blood Serum of some Mammalia, Studied by the Electrometric Method. V. G QUAGLIARIELLO. Ist. fisiol. sper. r. univ. Napoli *Atti accad. Lincei*, **20**, II, 418–20; cf. *C. A.*, **5**, 3589.—The following values for $C_H \times 10^7$ and $C_{OH} \times 10^7$, resp., at 15–9°, were found: Human blood serum, 0.096–0.171, 3.41–6.72; dog (mean of 12 detns.), 0.221, 2.88; rabbit (mean of 7), 0.309, 2.07; chicken (mean of 2), 0.214, 2.98. CHAS. A. ROUILLER.

Distribution of Reducing Substances in Mammalian Blood. L. MICHAELIS AND

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P. RONA. *Biochem. Z.*, 37, 47–9.—The authors point out that their previous results have been confirmed by a number of independent workers, the only exceptions being Lyttkens and Sandgren (*Biochem. Z.*, 36, 261; *C. A.*, 6, 247). D. D. VAN SLYKE.

The Potassium, Sodium and Chlorine Contents of Red and White Striated Muscles and of Unstriated Muscles in Different Animals. A. CONSTANTINO. Physiolog. Inst., Univ. Naples. *Biochem. Z.*, 37, 52–77.—The smooth muscles contain more water than the striated. The ratio K : Na in different muscles shows marked variations, which the following values of the ratio represent: Rabbit (striated), 4.35; ox (stomach), 2.43; ox (retractor penis), 1.43; buffalo (ditto), 1.02; cow (uterus), 0.85. The original contains detailed results of numerous analyses. D. D. VAN SLYKE.

G. PATHOLOGY.

H. GIDEON WELLS.

Origin of Urobilin. FROMHOLDT. Moscow. *Z. exp. Path.*, 9, 268.—Urobilin is only found when bile has access to the intestin. Pathological conditions leading to absence of bile in the intestin, result in diminution and eventually to a lack of urobilin excreted in the urin. Feeding bile to patients with acholic intestins leads after a few days to an excretion of urobilin. Bile pigments, cholesterol, and bile salts fed, fail to give urobilin. Feeding the chromogen obtained through artificial reduction of bilirubin gives a marked output of urobilin. The presence of urobilin therefore is an indication of an increased reduction of bile pigments in the intestin. H. C. BRADLEY.

Determination of the Diastase Content of the Urin. ARNOLD GALAMBOS. III Med. Klin., Univ. Budapest. *Ber. klin. Wochschr.*, 40, 1796–7.—Bearing in mind the binding power of uric acid as a source of error, G. found that the Wohlgemuth method for the estn. of the diastase content of the urin is valuable diagnostically only in a few cases. Of 4 cases of carcinoma examd. 3 were normal in diastase content, while 1 contained none. In all cases of chronic nephritis there was no relation between the severity of the disease, the amt. of urin and the sp. gr. on the ne hand, and the diastase content on the other. The diastase content of the urin of 5 cases of diabetes mellitus and one case of diabetes insipidus was associated with the grade of polyuria. Seven liver cases and 4 leucemias had normal contents. Increased content was found only in fever and cachexias which had an oliguria, this being relative as shown by figures on 24-hr. specimens. H. J. CORPER.

Bacterial Growth upon Media Containing Calcium. AMY KINDBORG. Pharm. Inst. Univ. Bonn. *Berl. klin. Wochschr.*, 40, 1800.—Pneumococci grown on Ca glycerol agar were still transferable after a month, as were also those grown on blood glycerol agar, while on glycerol agar alone they were rarely transferable. Staphylococci, colon, typhoid, tubercle and diphtheria bacilli also grew best upon Ca medium. H. J. CORPER.

The Prognostic and Diagnostic Significance of the Antitrypsin Determination of the Blood Serum. G. KATZENBOGEN. Frauenklinik zu Strassburg. *Berl. klin. Wochschr.*, 41, 1840–3.—Patients in whom there is a destruction of leucocytes have a high antitrypsin index, independent of the cause of the disease. Malignant growths give a high content while in the case of benign growths the content is nearly normal. A high antitrypsin content is not definitly diagnostic of carcinoma, but a nearly normal content makes it highly improbable. If a high temp. is associated with a high antitrypsin content after parturition, an eventual decrease may be looked upon as a good symptom. High fever with constant increases in antitrypsin content in puerperal sepsis, on the other hand, should be considered an unfavorable symptom. H. J. C.

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The Presence of Urobilin and Bilirubin in Human Blood Serum. O. ROTH AND L. HERZFELD. Med. Klin., d. Univ. in Zürich. *Deutch. med. Wochschr.*, 46, 2129–31.—In 80 cases of urobilinuria examined, practically never was urobilin or urobilinogen found in the blood serum. Urobilin added to the whole blood could not be detected after a few mins. by means of the fluorescens test, having apparently been oxidized as shown by tests with H_2O_2 and blood and CO_2. Blood from patients with a high grade urobilinuria reduced by Zn dust gave a good urobilin test. Kidney plus serum gave the urobilin test. Every serum contains substances which give the typical reaction for gall coloring matter. H. J. C.

The Significance of Blood-clotting Power for the Formation of Thrombi. HERMANN KÜSTER. Kgl. Univ., Frauenklinik zu Breslau. *Münch med. Wochschr.*, 46, 1442–3.—Exam. of healthy and sick women, puerperal and parturient women for differences in ferment content to explain the clotting, yielded negative results. The fibrinogen content was higher in pregnancy, but no relation was found between the fibrinogen content and the tendency toward thrombosis. H. J. C.

Typhoid Vaccin as a Prophylactic in Typhoid Fever. P. A. JACOBS. Cleveland. *Cleve. Med. J.*, 10, 927–31.—Evidence is brought forward showing the practical usefulness of the product in prophylaxis. P. J. HANZLIK.

The Chemistry of Tuberculin. GEORG LOCKEMANN. Chem. Abt. Inst. f. Infektionskrankh., Berlin. *Z. physiol. Chem.*, 73, 389–97.—When tubercle bacilli are grown in a medium containing asparagine as the sole source of N, the filtered culture fluid after 4 weeks' growth ("Tuberculin A. F.") contains coagulable protein giving the reactions with HNO_3, $(NH_4)_2SO_4$, Molisch's and Millon's reagents, etc., but not the glyoxylic reaction. After 8 and 12 weeks' growth the reactions are more intense. The com. prep. "Endotin C." responds to none of the protein tests. A. HUNTER.

Differences in the Urin of Healthy and Carcinomatous Individuals. KENJI KOJO. Chem. Abt. Path. Inst., Univ. Berlin. *Z. physiol. Chem.*, 73, 416–33.—Fresh urin is treated with $BaCl_2$ + $Ba(OH)_2$ or with $Ca(OH)_2$ + $CaCl_2$, and the filtrate, rendered neutral or faintly alk. with AcOH, is pptd. either with Pb subacetate soln. or 10% $ZnSO_4$ or $ZnCl_2$; the N of the washed ppt. is detd. by Kjeldahl. In normal urin the Pb ppt. (10 cases) contained 1.05–1.51% of the total urinary N; the Zn ppt. (13 cases) 1.32–1.54%. Carcinomatous urins gave 2.15–4.62% in the Pb ppt. (11 cases); 2.10–4.74% in the Zn ppt. (14 cases). For clinical purposes it is recommended to render the urin slightly alk. with Na_2CO_3 and ppt. directly with 10% Zn soln. The values found are higher: Av. = 1.7% for normal, 4% for cancer urins. The maximal in health never reached the minimal in cancer. Each portion of the day's urin gave the same results. The exact nature of the substance pptd. was not detd. The Zn ppt. contained uric acid. A. HUNTER.

Origin of Sepsin. W. FORNET AND W. HEUBNER. *Arch. exp. Path. Pharm.*, 65, 428–53.—From the same culture material which had often been used for the prep. of pure sepsin, a microörganism was obtained and cultivated. The pure cultures of this organism produced the same symptoms as sepsin. From the active extracts of agar cultures no sepsin, however, could be isolated. The toxin could not be isolated. It is thermostabil and of colloidal nature. The toxin of putrefaction mixtures is not necessarily sepsin. The hypothesis is offered that the colloidal toxin is the mother substance of sepsin, the conversion of the former into the latter occurring in putrefaction mixtures or in the organism, the final action which is shown being that of sepsin itself. WALTER A. JACOBS.

Chemical Studies on Blood Regeneration. ERNST MASING. Med. Klinik. Heidelberg. *Arch. exp. Path. Pharm.*, 66, 71–83.—In the blood of anemic (bleeding and

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phenylhydrazine) rabbits and geese characteristic variations from the normal in th P-containing constituents were observed which points at regeneration phenomen In the rabbit serum the P of the alc. ether extract was increased. The red cells a richer in ether-sol. P (phosphatides) than the normal. In normal rabbit erythrocyt but little nucleic acid was detectable; in large amt., however, in those of anemic rabbit Likewise the nucleic acid content of anemic goose blood was essentially increase The protoplasm of goose erythrocytes contains probably nucleic acid which on hemol sis is dissolved. The increase in nucleic acid and phosphatides is apparently to b considered a criterion of the youth of the blood cells. WALTER A. JACOBS.

Nephritis and Blood Sugar. E. STILLING. Med. Univ. Klinik. Breslau. *Arch. exp. Path. Pharm.*, 66, 238–40.—S. detd. the blood sugar in a no. of cases of nephritis by the method of Forschbach and Severin (*C. A.*, 5, 2264, 2392, 3691). No hyper glucemia was observed in the cases studied (cf. E. Neubauer, *C. A.*, 4, 2004). W. A. J.

The Content of Diphtheria Antitoxins in Human Serum. M. KARASAWA AN B. SCHICK. Vienna. *Jahrb. Kinderheilk.*, 72, 264–79.—Blood from the umbilica cord always contained diphtheria antitoxins. In only 1 of 5 sera of infants all ove 6 wks. of age was antitoxin found. In the sera of 24 children from 2–1 yrs. of age antitoxin was found 13 times, while in 9 cases out of 13 in adult's serum antitoxin was present. In 3 cases of diphtheria in children 6–8 yrs. of age, no antitoxi was present. H. B. LEWIS.

The Content of Diphtheria Antitoxins in the Serum of Children Suffering from Diphtheria and Measles. M. KARASAWA AND G. SCHICK. K. k. Kinderklin., Vienna. *Jahrb. Kinderheilk.*, 72, 460–6.—The antitoxin content in the serum at the height of the disease was the same in mild and severe cases of diphtheria. No permanent antitoxins were present in the serum in spite of repeated attacks of diphtheria. During attacks of measles there was no change in the quantity of diphtheria antitoxin of the serum. H. B. LEWIS.

Paroxysmal Cold Hemoglobinuria. M. BRÜCKNER. Inner. Abt. Kinderheilan stalt, Dresden. *Jahrb. Kinderheilk.*, 73, 131–41.—The blood of a luetic boy in whom hemoglobinuria was produced by intense cold was studied. If the blood were first cooled, then warmed, homolysis took place, but no hemolysis resulted from either cooling or heating alone. No hemolysis resulted if the serum and corpuscles were sepd. and cooled, then warmed and mixed. The serum contained a substance able to act on the corpuscles in the cold. The power to produce hemolysis was lost if the serum was heated to 55°, but could be restored by the addition of a normal human serum. The serum of the boy was also able to hemolyze normal human erythrocytes. The blood did not possess the hemolytic power at all times, but acquired it if normal serum was added. The hemolytic power was greatest after attacks of hemoglobinuria. There were apparently 2 factors in the hemolysis, one, an abnormal factor which united with the corpuscles in the cold, and a second, present in all sera, and destroyed by heat. H. B. LEWIS.

Experimental Spasmus Nutans and the Effect of Products of the Decomposition of Urin on Young Dogs. R. W. RAUDNITZ. Prague. *Jahrb. Kinderheilk.*, 73, 259–65.—Young dogs kept 8 months in an atm. satd. with NH_3 and the gaseous decomp. products of their own urin did not develop any rachitic changes in the bones. If dogs were kept in the dark from birth, nystagmus developed in 6–8 weeks, shaking of the head in 3–4 months. If the animals were allowed to live in the light 2–5 weeks, then the development of nystagmus on placing them in the dark was delayed, while the dark had no effect on dogs of 2 months or over. An animal if brought into the light at the

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beginning of nystagmus soon recovered, but after a long period of nystagmus no recovery followed. No alterations in the brain or eye were found. H. B. L.

Experiments on the Pathological Anatomy of Chronic Alcoholism. S. SALTYKOW. St. Gallen. *Centr. allgem. Path.*, 22, 850–8.—Extensive investigations, leading to the conclusion that, contrary to many observers, animals will suffer under alcoholism with anatomical changes comparable to those seen in man. H. G. W.

The Source of Glycogen in the Diabetic Kidney. FAHR. Path. Inst. städt. Krankenanstalt., Mannheim. *Centr. allgem. Path.*, 22, 945–9.—By microchem. methods glycogen can be demonstrated in the kidney of human diabetics and of depancreatized dogs, located in Bowman's capsule and in the lumen of the convoluted tubules; also in the cells of the loops of Henle but not in the epithelium of the convoluted tubules. From this it seems probable that the glycogen is excreted in the glomerules rather than by the tubules, and is resorbed in Henle's loops, in corroboration of Loeschcke. In the capsule of Bowman the glycogen is found not only in the lumen, but also in the epithelial coat which is commonly increased in thickness in diabetes, suggesting that the glycogen is formed from the sugar of the blood by these epithelial cells, which then excrete it into the urin. The blood of 2 depancreatized dogs contained, resp., 8 and 12 mg. glycogen per 100 cc., which is about the same as Pflüger found in normal fasting dogs. H. G. W.

Hemolysis in Carcinoma and other Diseases. J. GOLDBERGER. III Med. Klinik, Budapest. *Folia serol.*, 7, 941–52.—In carcinoma the resistance of the erythrocytes to hemolysis by lactic and oleic acids is reduced, but this reduction is not specific, for the corpuscles of tuberculous patients show the same condition. The anti-hemolytic property of the serum is increased in carcinoma, which seems characteristic for malignancy. H. G. W.

Cancer Immunity. CARL LEWIN. Berlin. *Folia serol.*, 7, 1013–28.—Review of literature, with the conclusion that although as yet the demonstration of antibodies in cancer has not been conclusively made, the immunity produced by previous injection of avirulent cancer material is an active immunity and dependent upon the production of cancer anti-bodies. There is no valid ground against this assumption, and many isolated facts in its favor. H. G. W.

Agglutination of Bacteria by Acid. L. MICHAELIS. Berlin. *Folia serol.*, 7, 1010–2.—The optimum conc. of H ions pptg. proteins from soln. is constant and characteristic for each protein, and it can be used for their identification; the conc. and nature of the anion is without effect. Agglutination of bacteria is produced by acids, with the same specific relation to the H ion conc. characteristic for each species of bacteria, and this fact can be used for identification of even the most closely related species, being more delicate than agglutination with specific antisera. The sort of acid used for the agglutination is entirely indifferent, as only the conc. of H ions dets. the agglutination. The practical application of this observation to differentiation of bacteria has been extremely successful. Typhoid bacilli are agglutinated by H conc. from 4 to 8 $\times$ 10^{-5} while paratyphoid bacilli of many strains all require from 16 to 32 $\times$ 10^{-5} to cause agglutination, and colon bacilli are not agglutinated at all by acids. *B. enteritidis* Gärtner is shown not to be individual. With different strains of typhoid bacilli the degrees of agglutination by specific sera and by acids run parallel, so that it seems probable that the same substance is acted upon by the specific agglutinins and by acids. But whereas with the specific agglutinins difficult agglutination of certain strains is a hindrance in identification, the reverse is the case with acid agglutination, since here the optimum conc. for agglutination is more easily recognized the less readily the bacteria are agglutinated. In the discussion of this paper it was

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reported by Poppe that he had corroborated the results of Michaelis, and that organisms not differentiable by specific antisera can be distinguished by the acid agglutination. H. G. W.

Immunology of Aqueous Humor. R. SALUS. Deut. Augenkl., Univ. Prague. *Kl. Monatsbl. Augenheilk.*, 12, 362; through *Z. Immunität., Ref.*, 4, 645.—Antitoxin and agglutinin but not precipitins enter the aq. humor in immune animals. Hemolysins, bacteriolysins, opsonins and anaphylactic antibody also appear in this fluid. H. G. W.

Bacterial Lipoids. Y. FUKUHARA. Path.-bakt. Inst., Osaka. *Chugai Iji-Shimpo*, 1911, No. 739–40; through *Z. Immunität., Ref.*, 4, 647.—A discussion of the bactericidal, hemolytic, antitoxic and other immunological properties of bacterial lipoids. H. G. W.

The Influence of Typhotoxin, Antityphotoxin and other Bacterial Toxins on Leucocytes. S. ICHIKAWA AND H. NISHIGUCHI. Bact.-pathol. Lab., Momoyama Hosp., Tokio. *Mitt. med. Ges. Oska*, 10, No. 7; through *Z. Immunität., Ref.*, 4, 650.—The portion of bouillon cultures of typhoid bacilli which is insol. in alc. when fed to rabbits causes the characteristic leucopenia of typhoid infections. If fed together with anti-typhoid serum this leucopenia does not develop, and existing leucopenia can be overcome by antiserum. A dose of 0.0004 g. dried typhoid bacilli fed to a rabbit is sufficient to cause the reduction in leucocytes. Paratyphoid bacilli and dysentery bacilli cause but a slight leucopenia when fed to rabbits, and colon bacilli are without effect; diphtheria bacilli, and the toxic products of plague bacilli, cholera, vibrios, streptococcus and staphyloccocus, cause leucocytosis. The effect of these bacteria is not altered by heat, drying and conservation. H. G. W.

Injection of Chondroitin-sulfuric Acid in Cancer. R. OESTREICH. Königin. Augusta Hosp., Berlin. *Z. Krebsfrsch.*, 11, 44–64.—Based on the resistance of cartilage and artery walls (both rich in chondroitin-H_2SO_4) to cancer, O. tried injection of this substance in 0.1 g. doses of Na salt. As with experimental animals, no amyloidosis followed this procedure. Pain in the tumor, and a tendency to necrosis, are interpreted as results of the injections. H. G. W.

The Preparation of Powerful Sheep Hemolysins without the Use of Sheep Blood. J. FORSSMAN. Path. Inst., Univ. Lund. *Biochem. Z.*, 37, 78–115.—Formation of sheep hemolysins results from the injection into rabbits of emulsions of guinea-pig organs (liver, kidney, adrenals, testes, brain, but not of blood). The hemolysins thus obtained are comparable in activity with those resulting from injection of sheep blood. Like the usual hemolysin, they consist of immune body and alexin. After $^1/_2$ hr. heating at 56°, they are reactivated by rabbit serum, or still better by guinea-pig serum. They combine with the same receptors in the sheep corpuscles as the usual sheep hemolysin. They are even more specific than the ordinary sheep hemolysin, for they do not dissolve ox corpuscles. The formation of the "guinea-pig" sheep hemolysins occurs without any combination between the antigen and the hemolytic antibodies. This is contrary to the side-chain explanation of immune body formation, which therefore fails to be a general explanation of this phenomenon. These hemolysins are similar to normal hemolysin, and both are different from that resulting from injection of blood. D. D. VAN SLYKE.

The Influence of Strychnine upon Bacteria. W. L. SSADIKOW. *Centr. Bakt. Parasitenk, 1st. Abt.*, 60, 417–25.—Only staphylococci and mycelial forms grow on 2% strychnine agar; *B. subtilis, proteus, mesentericus, coli, typhosus*, and *prodigiosus* grow on 0.5%. *Vibrio dencke* does not grow even on 0.1% strychnine agar. *Staph. aureus* grows unhindered upon 2% strychnine-phosphate agar, and does not lose

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its color-producing properties, but when grown upon 2% strychnine-HCl agar the colonies are colorless though the growth is good. *Sarcina flava* and *B. prodigiosus* grow in colorless colonies on strychnine agar but recover their color when grown upon plain agar after several transfers. The bacteria sep. (ppt.) the strychnine out of media containing strychnine salts as a result of formation of basic material by bacterial proteolytic action. Strychnine salts influence bacterial ferments; 0.2% strychnine-phosphate prevents proteolysis of gelatin. Invertase and glucase are likewise hindered, but *B. coli* can still grow, and therefore probably all ferments are not thus affected. H. J. CORPER.

H. PHARMACOLOGY.

ALFRED N. RICHARDS.

Mechanism of Glucosuria. NIRO MASUDA. Tokio. *Z. exp. Path.*, 9, 246.—Injections of nicotine and adrenaline into dogs following nearly complete extirpation of the pancreas, failed to produce increased sugar output. H. C. BRADLEY.

Contributions to the Toxicology of Agaricinae. FRITZ RABE. Univ. Rostock. *Z. exp. Path.*, 9, 352–64.—Aq. exts. of dried *Amanita phalloides* hemolyze the corpuscles of various species of animals, sometimes with a formation of methemoglobin. Small doses, given subcutaneously, kill warm-blooded animals. The poison is also active when given by mouth. The residue after extraction is not toxic. EtOH and $Pb(OAc)_2$ ppt. the hemolysin almost completely, $UrO_2(OAc)_2$ only partially. This hemolysin gives the Millon and Pb-blackening S, but not the biuret, reactions. It is weakened by drying and at 65° loses its hemolytic and poisonous properties. Warm-blooded animals can be immunized to it. Methemoglobin is not formed in hemolysis with the pptd. hemolysin. The aq. ext. also contains an alkaloid, sol. in Et_2O, insol. in $CHCl_3$. It kills both warm- and cold-blooded animals and acts like muscarine upon an isolated frog heart. *Amanita mappa* contains the same active substances as *A. phalloides* but in much smaller amt. The *A. mappa* hemolysin also agglutinates the red blood-cells. J. GREENWALD.

The Varying Action of Digitoxin upon the Blood Vessels of Different Organs. CARL FAHRENKAMP. Pharm. Inst., Univ. Heidelberg. *Arch. exp. Path. Pharm.*, 65, 367–88.—By use of the method of Kasztan (*C. A.*, 5, 1613) digitoxin, like strophanthin, was found to exert 2 different actions upon the walls of the blood vessels. In strong conc. the contracting effect is strongest, in the lowest conc. the dilator effect predominates. This last, however, in contrast to strophanthin can be obtained with digitoxin only on the vessels of the kidney. The vessels of the various organs react differently to digitoxin but in a regular manner. The intestinal blood vessels are most susceptible to the contracting influence of digitoxin, even in the smallest active conc. The lowest active conc. expands the vessels of the kidney; higher concs. contract. The skin-muscle vessels are the least susceptible to the action of digitoxin. The threshold values of the toxic conc. for the heart with digitoxin and strophanthin-g were found to lie within the same zone as those for the other organs. WALTER A. JACOBS.

The Permeability of the Walls of the Blood Vessels. S. WEBER. Med. Univ. Klinik. Greifswald. *Arch. exp. Path. Pharm.*, 65, 389–400.—Rabbits with ligated kidneys were injected intravenously with 10% NaCl and 10% NaCl + 10% Na_2SO_4 (cryst.) solns. The dry substance, ash and NaCl content of the blood before and after the injections were detd. The differences so obtained were compared with those obtained by injections of the same solns. containing also theophylline, As_2O_3 and uranyl acetate. Both theophylline and As_2O_3 increase the permeability of the walls of the blood vessels. A change in the permeability with uranyl acetate could not be ascertained. W. A. J.

The Point of Attack in the Peripheral Action of Guanidine. HERMANN FÜHNER.

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Pharm. Inst., Univ. Freiburg i/B. *Arch exp. Path Pharm.*, 65, 401–27; cf. *C. A.*, 2,,1570 and Camis, *C. A.*, 5, 518.—Contrary to Camis' results and in agreement with his own earlier findings, F. shows that the gastrocnemius and foot muscles of the toad after degeneration in nervus ischiadicus, no longer react upon guanidine application. The point of attack of the peripheral exciting action of guanidine is therefore the endings of the motor nerves which degenerate after cutting. W. A. J.

The Action of Crystallin Aconitine on the Isolated Frog Heart. CURT HARTUNG. Pharm. Inst., Univ. Leipzig. *Arch. exp. Path. Pharm.*, 66, 1–57.—The action consists of an increase in the excitability, particularly of the ventricle, less of the auricle; further in disturbances of conduction and then in a diminution of the intensity of the contractions resulting in paralysis. W. A. J.

The Action of Crystallin Aconitine on the Motor Nerves and on the Skeletal Muscles of Cold-blooded Animals. CURT HARTUNG. Pharm. Inst., Univ. Leipzig. *Arch. exp. Path. Pharm.*, 66, 58–70.—Aconitine in stronger conc. acts both by direct or indirect application on the motor nerves, first exciting and then paralyzing. Weaker solns. cause little or no stimulation and lead after a time to paralysis of the motor nerves and later to that of the muscle substance. The limiting toxic conc. for the nerves is about 1 to 2–4,000,000; for the muscle, 1 to 2–400,000. W. A. J.

The Action of Intravenous Injections of Concentrated Salt and Sugar Solutions. G. G. WILENKO. Inst. f. exp. Pharm., Univ. Lemberg. *Arch. exp. Path. Pharm.*, 66, 143–59.—Intravenous injection of conc. NaCl soln. produces a hyperglucemia through excitation of the central nervous system whereby the muscles and perhaps also the liver lose glycogen. The nerve excitation is a cation effect. Intravenous injection of conc. NaCl soln. changes the permeability of the kidney for sugar. This phenomenon is conditioned by osmotic factors and proceeds apparently in 2 phases: first an increase and then a diminished permeability of the kidney for sugar. Intravenous injection of conc. glucose solns. produces a similar though less pronounced change in the permeability of the kidney for sugar. W. A. J.

The Determination of the Pharmacological Activity of the Leaves of Digitalis purpurea. ARNOLD HOLSTE. Lab. f. exp. Pharm., Strassburg. *Arch. exp. Path. Pharm.*, 66, 161–70; cf. O. Schmiedeberg, *C. A.*, 4, 2658.—The ratio between the pharmacological values of 2 sets of leaves did not change in the course of 1 year. W. A. J.

The Heart Action of Barium Ions. N. WERSCHININ. Pharm. Inst., Heidelberg. *Arch. exp. Path. Pharm.*, 66, 191–204.—Like the substances of the digitalis group, Ba ions exert both a systolic and diastolic action upon either endo- or exocardial application. The difference between the 2 is merely quant. and is due to the lesser penetrability of Ba ions into the heart (frog). The nature of the pause is dependent upon the conc. The Ba intoxication of the frog heart even after several hrs. pause can be promptly overcome by rinsing with Ringer soln. Ba ions are in this manner readily removed from the heart. W. A. J.

The Pharmacological Properties of a Few Acid Oxidation Products of Cholesterol. FERDINAND FLURY. Pharm. Inst., Univ. Würzburg. *Arch. exp. Path, Pharm.*, 66, 221–37.—The acids, $C_{27}H_{44}O_4$, $C_{27}H_{40}O_5$ and $C_{27}H_{40}O_8$, obtained by the oxidation of cholesterol, according to their physiological behavior may be placed in the pharmacological group of the bile acids and the saponins. Like these they are absorbed with difficulty, cause local necrosis of the tissues, paralysis of the skeletal and heart muscles, slowing of the pulse and strong hemolysis. Possibly these acids occur as intermediate products in the formation of the bile acids from cholesterol in the organism and as such possess a distinct physiological function. W. A. J.

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The Action of Very Small Amounts of Acids upon the Blood Vessels. CARL SCHWARZ AND FRIEDA LEMBERGER. Physiol. Inst., Univ. Vienna. *Arch. ges. Physiol.*, 141, 59–70.—Very small amts. of acids brought into the arterial system of organs isolated on the central nervous system produce a dilatation lasting for a short time. The submaxillary glands of the cat and the intracranial vessels of the dog were studied. Lanine and glycocoll which are weaker than CO_2 are without action. Increase of the O_2 tension of the blood by inhalation of CO_2 or CO_2–O mixts. produces a considerable dilatation. Asphyxia produces likewise a peripheral vasodilatation. The vasodilating effect occurs in animals poisoned with nicotine and is of peripheral origin as with adrenaline. The immediate cause of the peripheral vasodilating action of acids is the liberation of CO_2 from Na_2CO_3 and the consequent increase of CO_2 tension in the blood. W. A. J.

Experimental Acute Nephritis: The Elimination of Nitrogen and Chlorides as Compared with that of Phenolsulfonephthalein. J. HAROLD AUSTIN AND A. B. EISENBEY. Dept. Res. Med., Univ. Penn. *J. Exp. Med.*, 14, 366–76.—U and cantharidin in the smallest doses capable of producing a distinct nephritis, tend to increase the elimination of N, probably by stimulating tissue katabolism. U, cantharidin and K_2CrO_4, in largest doses, impair the power of the kidney to eliminate N; but this may not be evident unless the animal is on abundant N diet, and when due to K_2CrO_4 may not last more than a day. Small doses of U and cantharidin cause a transient increase of Cl elimination which generally corresponds to the excess of diuresis. Large doses of U and K_2CrO_4 cause a fall, usually transient, in the Cl elimination. The Cl elimination may be diminished 40% for 24 hrs. without evidences of intoxication. The decrease in the elimination of phenolsulfonephthalein which occurs in U, K_2CrO_4 and cantharidin nephritides and which is proportional to the dose of the poison, bears no constant relation to the changes in the N or Cl elimination. A marked decrease in the elimination of phenolsulfonephthalein occurs synchronously, as a rule, with the onset of the symptoms, and therefore the phenolsulfonephthalein test would seem to be a better indicator of the ability of the kidney to eliminate the toxic substance responsible for renal insufficiency than the anatomic changes or the N or Cl elimination. W. A. J.

The Effect of Suga and Sodium Chloride on the Infant Organism. S. COBLINER. Städt. Krankenh., Wiesbaden. *Jahrb. Kinderheilk.*, 73, 430–58.—Subcutaneous injection of 5.5% dextrose soln. (150–250 cc.) caused fever in infants. If K or Ca salts were added to the sugar soln. no fever resulted. Solns. of NaCl introduced parenterally, rectally, or subcutaneously produced an increased temp. Small amts. of sugar were found in the urin in the NaCl expts., also an increased sugar content of the blood. H. B. LEWIS.

Influence of Internal Secretions on the Coagulation of the Blood. G. GARGIULO. Inst. Med. Pathol., Camerino. *Boll. soc. eustachiana*, 8, Fasc. 6; through *Z. Immunität., Ref.*, 4, 645.—Injection into rabbits of ext. of hypophysis increases the coagulability of the blood by 3 or 4 times during the first 24 hrs. Parathyroid ext. increases coagulability of the blood 20 time for 48 hrs. H. G. W.

Toxicity of Extracts of Lung and Lymphatic Tissue. CESA BIANCHI. Clinic Ind. Diseases, Milan. *Pathologica*, 3, No. 59 and 61; through *Z. Immunität., Ref.*, 4, 631.—Watery exts. of rabbit lung cause severe intoxication when injected into the veins of other rabbits, causing death in a few sec., even with doses of 1 cc. or less of ext. Effects are the same with lung exts. of other lab. animals whether used upon homologous or heterologous species. Resembles anaphylactic intoxication. Effects are similar but less marked from subcutaneous and intraperitoneal injections,

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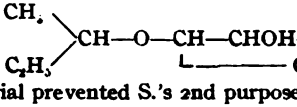
but not from feeding. Non-lethal doses reduce susceptibility of animals to subsequent doses of same ext. for a period of about 48 hrs. Similar toxicity was observed with exts. of lymph glands and thymus, but not with spleen. H. G. W.

Hemolytic Action of Fatty Acids. J. SHIMAZONO. Med. klin. Univ. Tokio. *Mitt. med. Soc. Tokio*, 25, No. 13; through *Z. Immunität., Ref.*, 4, 656.—Study of hemolytic powers of Na salts of fatty acid series. The higher fatty acid salts are hemolytic from capric acid upward, while the lower acids up to caproic are not hemolytic; nonoic acid is at the turning point, its salt being faintly lytic. H. G. W.

The Degradation of Carboxylic Acids in the Animal Body. XIII. The Behavior of Furylacrylic and Furoylacetic Acids in the Animal Body. ERNST FRIEDMANN. Lab. I. med. Klinik Kg. Charité, Berlin. *Biochem. Z.*, 35, 40–8.—When furylacrylic acid (as the Na salt) is injected subcutaneously in dogs, 29% of the acid is eliminated in the urin as such (conjugated with glycocoll), and also as pyromucic acid (22%) and furyl methyl ketone. These facts seemed to indicate that furyloacetic acid was formed as an intermediary product. After feeding both the Na salt and the ester of this acid 35% of the acid was eliminated and after subcutaneous injection 50% was found in the urin. Pyromucic and pyromycuric acids were not present in either case. This proves that a β-keto acid is not formed as an intermediate product in the breaking down of furylacrylic or furylpropionic acid to pyromucic acid, and also establishes the opinion formerly expressed that the α-β-unsatd. acids can be broken down to acids with 2 less C atoms without the formation of keto acids as intermediate products. F. J. BIRCHARD.

***p*-Cresolglucuronic Acid.** C. NEUBERG AND E. KRETSCHMER. Berlin. *Biochem. Z.*, 36, 15–21.—The compd. was obtained from the urin of dogs, to which *p*-cresol had been administered, in the form of a Ba salt which proved to be an equimol. compd. of *p*-cresolglucuronic acid with conjugated H_2SO_4, the nature of which was shown by analysis and characteristic reaction for glucuronic acid. LA FORGE.

2-Butanolglucuronic Acid. SUMIO SANEYOSHI. Berlin. *Biochem. Z.*, 36, 22–4.—An attempt was made to det. whether the organism is capable of performing an asymmetric reduction of a ketone to an optically active alc. Neubauer observed (*Arch. klin. Med.*, 95, 211) that after administration of methyl ethyl ketone a substance could be pptd. from the urin with $Pb(OAc)_2$ and NH_3 which was optically active and supposed to be a conjugated glucuronic acid compd. with butyl alc. If this were the case S. hoped by hydrolysis of the above compd. to obtain the active butanol and by polarimetric detn. settle the question at issue. Methyl ethyl ketone was administered to rabbits whose urin was collected and from the Pb compd. after removal of the Pb with H_2S, a Ba salt was prepared which gave all the expected color reactions and analyses. Absence of reduction with Fehling's soln. makes it probable that the compd. is of the type of the glucosides.



Lack of sufficient material prevented S.'s 2nd purpose from being realized.

LA FORGE.

The Behavior of Ethyleneglycol, Propyleneglycol and Glycerol in the Animal Organism. SOICHIRO MIURA. Berlin. *Biochem. Z.*, 36, 25–31.—To gain information as to the fate of these substances, attempts were made to isolate conjugated glucuronic acids of them or their decomp. products in the urin of rabbits after their administration. No such compds. of glycerol or ethyleneglycol were obtained. However, after administration of propyleneglycol, not inappreciable amts. of a monoglucuronic acid compd. of propyleneglycol in the form of a Ba salt were isolated and analyzed. Further, no reducing substance was found after administration of glycerol. LA FORGE.

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The Behavior of the Stereoisomeric Tartaric Acids in the Organism of the Dog. C. NEUBERG AND SUMIO SANEYOSHI. Berlin. *Biochem. Z.*, 36, 31–6.—Expts. by A. Brion (*Z. physiol. Chem.*, 25, 282) seemed to have shown that the organism destroyed more of the *l*-form of tartaric acid, which does not occur in nature, than of the *d*-form, while the *dl*-form was consumed quite uniformly and left the body in the inactive form. From more extended expts. it was found that the ability of the organism to destroy tartaric acid of either form varied greatly with conditions and this variation had led to the above erroneous results. It was further shown that Brion's third observation was entirely correct in that the organism shows no preference, in the case of tartaric acid, for either optical form. LA FORGE.

Hemolysis under the Influence of Carbon Monoxide. B. BUBANOVIC. Physiol. Lab., Univ. Groningen. *Biochem. Z.*, 37, 139–41.—Blood treated with CO requires slightly greater diln. to start hemolysis than does normal blood. Apparently the CO drives out part of the CO_2 normally present in the blood, and thereby increases the ability of the cells to take up water. D. D. VAN SLYKE.

Influence of Radium on the Production of Antibodies in the Animal Organism. ALBERT SCHÜTZE. Berlin. *Med. Klinik*, 7, 1729–30.—S. tested the effect of Ra on the normal hemolysin of rabbit serum inactivated for ½ hr. at 55°, against 5% of washed sheep blood corpuscles, using 0.1 *N* guinea-pig serum as complement. The sera of 3 rabbits which had received 4, 6 and 12 cc. each of Radiogen intravenously gave a change in their hemolytic titer 8–10 days later, which before the expt. was found to be 0.08 to 0.1. P. J. H.

I. ZOOLOGY.

R. A. GORTNER.

The Behavior of the Glycogen in the Ovaries of Rana fusca. MAX BLEIBTREU. Physiol. Inst., Univ. Greifswald. *Arch. ges. Physiol.*, 141, 328–42.—Amplification of the expts. of Kan Kato (*Ibid.*, 132, 545). In addition the total glycogen was found to diminish after sporing time reaching a minimum in June. From that time it again increases, reaching a max. in Sept. to Oct. WALTER A. JACOBS.

The Light of Pyrosoma elegans, Les. OSW. POLIMANTI. Zoöl. Stat., Naples. *Z. Biol.*, 55, 505–29.—P. concludes that the photogenic substance is of a fatty nature, and that the process is not an oxidation. F. ALEX. MCDERMOTT.

Structure, Physiology and Use of Photogenic Organs with Special Reference to the Lampyridae. E. J. LUND. Zoöl. Lab., Johns Hopkins Univ. *J. Exp. Zoölogy*, 11, 415–67.—The reduction of OsO_4 in the tracheal end-cells is due to a substance having the nature of a reductase, and the photogenic process is dependent on the presence of this substance. The photogenic process consists in the reaction of formed substances in the presence of water and O, and is independent of the life of the cell. The photogenic substance is nitrogenous, and gives the stain reactions of a lecithin: Nitrogenous waste product resembling the cleavage-products of nucleic acid is formed and is deposited in the dorsal cells. F. A. MCD.

Flagellates, Ciliates, etc., in Water (RUEDIGER). 14.

14. WATER, SEWAGE AND SANITATION.

EDWARD BARTOW.

Recent Developments of the Phenolsulfonic Acid Method for the Determination of Nitrates in Water. A. E. JOHNSON. *Chem. News*, 104, 235.—A discussion of the

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paper by Chamot, Pratt and Redfield (cf. *C. A.*, 5, 1721) in which J. claims to have been misquoted. W. F. LANGELIER.

Some Observations on So-called Flagellates, Ciliates and other Protozoa Encountered in Water and in Human Stools. (Preliminary Report.) E. H. RUEDIGER. *Philipp. J. Sci.*, 6, 155–9.—The diarrheal stools of members of a camping party often were found to contain flagellates, and ciliates occasionally. Three samples of the drinking water partaken by the members of the camping party were examined, one of which swarmed with flagellates; another contained a large number of ciliates. None contained amoeba. The ciliates when present in sufficient number destroyed the flagellates. If the flagellates outnumber the ciliates the latter encyst. The ciliates can be easily cultivated in symbiosis with bacteria on liquid and solid culture media; no pure culture could be obtained however. Flagellates could not be successfully cultivated on ciliate media. The ciliates multiply by transverse cell division. ARTHUR LEDERER.

The Importance of the Ammonia in Judging the Chemical Quality of Drinking Waters. I. HUG. Zurich. *Das Wasser*, 26, 887–8; *Wasser u. Abwasser*, 4, 522–3. —NH_3 does not originate under all conditions from the decomp. of animal protein alone. In waters poor in O the organic substances present will reduce the nitrates to free NH_3. Such a process is likely to take place in ground waters where there is no aeration possible. Small quantities of NH_3 are, therefore, of no significance in such a case. A. L.

Magnesium Stalagmitic Growth in Sea Water. T. U. WALTON. *J. Soc. Chem. Ind.*, 30, 1189.—Minute leaks in a coil of pipe containing NH_3 under pressure, immersed in a bath of sea water, caused columns of mineral matter to grow vertically upwards. The growths were each from 5 to 14 in. long and from $^1/_4$ to 2 in. thick. Analysis showed the dried material to contain 88% $Mg(OH)_2$, 8% $CaCO_3$, 0.9% $CaSO_4$ and 2.8% NaCl. W. F. LANGELIER.

The Circulation of the Water Vapor and the Salt Contents of the Oceans. A. I. WOEJKOW. *Meteorol. Z.*, 1911, 1–6; *Geol. Zentr.*, 16, 467; *Wasser und Abwasser*, 4, 511.—The quantity of salt in the Atlantic ocean is larger than in the Pacific and Indian ocean on account of its low shores. The winds carry the vapors far into the continent, partly outside the limit of the watershed basin. ARTHUR LEDERER.

Dissolved Gases of the Island Lakes of Wisconsin and their Biological Significance. E. A. BIRGE AND CHARLES JUDAY. Wis. Nat. Hist. Survey, *Bull.* 12; *Scientific Series*, 7, (1911); *Eng. News*, 66, 558–9.—The report constitutes a physical, chem. and biological survey of 156 lakes. During the 5 yrs. of the work a total of 900 series of dissolved gas detns., particularly of the O and CO_2, have been made. The Winkler method has been used for the detn. of dissolved O. The algae through their photosynthetic process can raise the amt. of O appreciably above the satn. point. The variations in the quantity of the gases during different times of the year, and the seasonal distribution of the plankton are given. A. L.

Disinfection Experiments with Hypochlorite of Calcium on the Carnegie Swimming Pool, Yale University. L. F. RETTGER AND S. C. MARKLEY. *Eng. News*, 66, 636–8. —The authors recommend the use of 0.3–0.5 pts. per. mil. available Cl daily as being the most effective means for securing disinfection. W. F. LANGELIER.

Treatment of Water with Boiler Compounds. E. BARTOW AND W. C. MARTI. Univ. Ill., State Water Survey, *Bull.* 8, 59–74.—A very interesting app. is described for this investigation. A tubulated bottle, well elevated, serves as reservoir; water is drawn through a 500 cc. flask, which serves to control the water level, by siphon into a 1000 cc. flask. The difference in weight between the cleaned flask and same

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with such incrustation as is not removed by rinsing, represents scale-forming material. A piece of weighed Fe also serves to est. corrosive action. Several compds. are used in Univ. of Ill. water and Miss R. at Quincy. High alkalinity reduced corrosion and increased foaming; as scale decreased, corrosion increased. Na_2CO_3 was not satisfactory as it made foaming too prominent. Results are not considered complete. D. K. FRENCH.

The Operation of the Rock Island Filter Plant. ANON. *Eng. Record*, 64, 681–2.—A description of the plant, accompanied by tables and charts. A. LEDERER.

Purifying St. Lawrence River Water at Ogdensburg, N. Y. ANON. *Eng. Record*, 64, 642–3.—A description of a filter plant of the slow sand type to purify water from the St. Lawrence R. ARTHUR LEDERER.

Water Purification at Philadelphia during 1910. ANON. *Eng. Record*, 64, 651–2.—A description of the operating results and costs of filtering water at the 4 municipal plants. ARTHUR LEDERER.

A Canadian Sterilization Plant for a Municipal Water Supply. ANON. *Eng. Record*, 64, 685–6.—A description of an emergency and permanent sterilization plant for applying $Ca(OCl)_2$ to the water supply at Strathcona, Alberta. The sterilization checked effectively the prevalence of typhoid fever. A. L.

The Disinfection of Water. R. G. PERKINS. West. Reserve Univ. *Water and Gas. Rev.*, 22, No. 3, 12–5.—A brief review dealing with $CuSO_4$ as an algicide and germicide, the app. at Marseilles, the O_3 method, the Siemens-Halske app., the Cl method and the use of $Ca(OCl)_2$. The last is the cheapest and simplest method of sterilization and with high diln. and proper time factor, there will be no complaint from its use. S. T. POWELL.

Stream Pollution in Ohio. JOHN W. HILL. Central States W. W. Assn. *Water and Gas Rev.*, 22, No. 5, 8–11.—A discussion of the present status of stream pollution in Ohio. S. T. POWELL.

Sewer Gas and Disease. HOLLIS GODFREY. *Water and Gas Rev.*, 22, No. 2, 20–3.—A review of the investigation undertaken by the Master Plumbers' Assoc. to det. the effect of sewer gas upon health and the carriage of pathogenic germs. S. T. P.

Automatic Sewage Pumping Station, Wave Crest (L. I.). ANON. *Eng. Record*, 64, 656–7.—The low level flow of certain areas in the borough of Queens, New York City, will be collected at a single point and pumped through a force main to the Far Rockaway disposal plant. ARTHUR LEDERER.

Two Biologic Sewage Purification Plants in the Emscher District. BACH AND BUNK. *Gesundh. Ing.*, 34, 773–82, 821–9.—The purification plants of the coal miners colony "Graf Schwerin" and of Holzwickede, a small community, are described. The sludge from the Emscher tanks used at the former plant dries rapidly inside of a few days. The chem. results of the plant are very satisfactory. The final effluent is always non-putrescible. The dried sludge is sold as fertilizer. The effluent of the latter plant is non-putrescible. The sludge is air-dried and sold as fertilizer. A. L.

U. S., 1,009,857, Nov. 28. H. REISERT, Cologne, Ger. **Water-purifying apparatus.**

U. S., 1,010,210, Nov. 28. K. L. V. ZIMMER, Hamburg, Ger. **Making an easily emulsifiable disinfectant** from mineral oils, tar, tar oil, resin oil, etc., by mixing a cuscinate soln. with sulfonated oil which has been partially neutralized, introducing CH_2O into the mixt., gradually introducing the raw oily material into the product and thoroughly mixing.

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15. SOILS AND FERTILIZERS.

F. P. VEITCH.

Determination of Colloids in the Soil. J. KÖNIG, J. HASENBÄUMER AND C. HASSLER *Landw. Vers. Stat.*, 75, 377–441.—Colloidal substances in the soil are of 2 classes, (1) mineral and (2) humus. Soils poor in mineral colloids can contain just so much more humus colloids and *vice versa*. The colloids in soils may be detd. by (1) their power of absorbing coloring matter. Methyl violet is best for such a purpose. It should be used in concs. of 1, 2 and 3 g. per l. The conc. of the methyl violet and the amt. of the soil must be so regulated that not all of the color is absorbed but enough should be absorbed to show a distinct change in color before and after absorption. The absorption depends on the combination of the coloring matter and the colloidal clay substances present, and the amt. of absorption is detd. by the colorimeter. (2) Detn. by absorption of mineral salts. For this purpose 0.02 *N* K_2HPO_4 is used. The K_2O is mainly taken up by the colloidal clay; this combination is unstable and can be partly or entirely stopped by steaming, by the action of H_2O_2 or by the use of an elec. current. The P_2O_5 is combined with the CaO, Fe oxides and some of the clay. This depends on chem. combination and on the formation of insol. Ca phosphate, etc. By the action of heat the absorption is made more active and the P_2O_5 cannot be entirely brought into soln. by the elec. current. These methods are most reliable for the detn. of colloids in the surface and subsoil of the same soil; for the use of the color method with different soils, to obtain comparable results, all concs. must be the same. The authors offer a new method, depending on the use of a strong elec. current, for the detn. of easily sol. substances in the soil. The amt. of sol. substances in the soil increases as soon as K_2O becomes available. This is shown by steaming the soil, oxidizing with H_2O_2 or by the use of an elec. current. By a comparison of the nutritive material which the plant absorbs and the 3 soln. methods it is shown that by steaming and oxidation about the same amt. of K_2O is obtained, after factoring, as is absorbed by the plant. The value found by the electrical method is somewhat higher than by the other 2 methods. With P_2O_5 the relation limits were wider. Steaming showed from 2 to 5 times as much P_2O_5 as the plants absorbed. Oxidation can only distinguish between surface and subsoil of the same soil, since the amt. of P_2O_5 liberated depends chiefly on the amt. of humus colloids in the soil. For the elec. current the same applies as with the K_2O. With CaO it was shown that much more was obtained in soln. than the plants needed for their growth.

E. C. LATHROP.

The Hygroscopic Moisture of Soils. C. B. LIPMAN AND L. T. SHARP. *J. Physic. Chem.*, 15, 709–22.—It is necessary to use thin layers of soil in detg. their hygroscopic coeffs. A layer as nearly as possible 1 mm. in depth has been found the best. A rise in temp. is accompanied by a greater absorption of hygroscopic moisture, a fall in temp. by a decreased absorption. These changes do not take place according to any definite law. Similar results on the effect of temp. on the absorption of hygroscopic moisture by soils are obtained in the incubator as in the room though the total absorption and variations are much smaller.

M. X. SULLIVAN.

Some Factors Influencing the Percentages of Mineral Plant and Food Contained in Soils. O. D. ENGELN. *Am. J. Sci.*, 32, 350–8.—There is need of more reliable data on the chem. comp. of soils in the U. S. before broad generalizations can be made regarding the effects of varying amts. of mineral plant foods on soil fertility. Analyses indicate that there is a relationship between the chem. comp. and the geologic-physiographic conditions of soil origin and state, in that soil of the youngest glaciation has higher % of P_2O_5 and K_2O than soil of the oldest glaciation.

M. X. S.

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Nitrate Formation in Arable Soils. A. KOCH. Landw. bakt. Inst., Univ. Göttingen. *f. Landw.*, 59, 293–313.—In vessels protected from rain and snow, the NO_3 content ncreased more than in the field where leaching occurs. The nitrate production was greater in the surface soil than in subsoil where the N content decreased with the lepth. $(NH_4)_2SO_4$ applied in Nov. was $^1/_2$ nitrified by the following Mar. and completely y June. In surface soils it was found that 83–88% of the N. of $(NH_4)_2SO_4$ was nitrified while in subsoil (60–80 cm.) 78% of the N was recovered as nitrate. Application f lime to soil containing $(NH_4)_2SO_4$ checked nitrification as long as NH_3 was given ff. Added alone lime increased nitrification until converted into the carbonate. M. X. S.

Effect of Soluble Salts on the Absorption of Phosphate by Soils. H. E. PATTEN. *J. Physic. Chem.*, 15, 639–58.—From expts. with a single substance, quartz, and with soils, a sandy soil and a fine clay, it appears that a higher conc. of phosphates may e obtained when weak solns. of salt ordinarily used as soil amendments, (KCl, K_2SO_4, KNO_3, $NaNO_3$ and K_2CO_4) are passed through the soil than can be obtained by the se of dist. H_2O alone. The effect is not simply a question of the solubility of the hosphate in water or the salt soln. since in all cases the amt. of water held in contact ith the soil is far greater than that required to dissolve the phosphates and other alts present. The effect is evidently due to a disturbance of the equil. which exists r tends to exist between the sol. material retained by the soil and the soil soln. This isturbance of equil. tends to readjust itself, giving roughly a steady value for the onc. of the leaching. M. X. S.

The Occurrence of Manganese in Soil and its Effect on Grass. F. B. GUTHRIE AND L. COHEN. *J. Proc. Roy. Soc. N. S. W.*, 43, 354–60.—Patches of a green where grass had died were found to contain Mn while nearby healthy patches did not. The authors suggest that the destruction of the grass may be due to the Mn which has been found toxic in certain cases. M. X. S.

The Fertilizing Action of Manganese. A. ANDOUARD AND P. ANDOUARD. *Engrais*, 26, 915–6.—The authors experimenting with wheat, potatoes, carrots and kidney beans, found that the presence of Mn increased the yield of the wheat and the beans but slightly decreased the yield of carrots and potatoes. E. C. LATHROP.

The Rational Fertilizer for Wheat. D. DONON. *Engrais*, 26, 908–10.—D. advises the following: 100 kg. dried blood + 150 kg. $(NH_4)_2SO_4$, 400–600 kg. mineral superphosphates, 100 kg. K_2O, or on poor soil 150–200 kg. K_2O. E. C. L.

Report of the Soil Chemist and Bacteriologist for 1909. JACOB G. LIPMAN. N. J. Agr. Coll., Expt. Sta.—This is a report of numerous expts. grouped under the subtitles: (1) Expts. on NH_3 and NO_3 formation in soils; (2) vegetation expts. with miscellaneous materials used as direct and indirect fertilizers; (3) some bacteriological relations in soils kept under greenhouse conditions. S. C. C.

Preliminary Report on the Klamath Marsh Experiment Farm. CARL S. SCOFIELD AND LYMAN J. BRIGGS. U. S. Dept. Agr., Bur. Plant Ind., *Circ.* 86.—These marshlands lack the essential elements of fertility and contain much black alkali, which cannot be leached out profitably on account of the highly impervious character of the underlying strata. S. C. CLARK.

Tidal Marshes and their Reclamation. GEORGE M. WARREN. U. S. Dept. Agric., Office of Exp't. Stations, Drainage Investigations, *Bull.* 240, 89.—Mech. and chem. analyses of 6 tide marsh soils from the Bay of Fundy. S. C. C.

The Role of Mica in Arable Soils. T. BIELER-CHATELAN. *Engrais*, 26, 967–8.—Mica is sol. in dist. water to the extent of 5 p. p. m., and on account of its influence

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in changing the physical and chem. characteristics of the soil should find use as a fertilizer. E. C. LATHROP.

A Centrifugal Method for the Determination of Humus. A. A. WELLS, W. H. STEVENSON AND W. F. COOVER. Iowa Col. Exp. Sta., *Bull.* 124.—The improved method and app. here described permits of humus detns. as accurate as the official but requiring only $^1/_3$ the time. W. P. GARRETT.

Organic Nitrogenous Compounds in Peat Soils. II. C. S. ROBINSON. Mich. Agr. Coll. Exp. Sta., *Techn. Bull.* 7; cf. *C. A.*, 5, 2139.—These studies show the complexity of the subject. Vegetable decomp. products contain compds. of great structural variety. Much N occurs in the form of a protein comp. or mixt. of compds. similar to casein, egg albumin, etc. In peat, 26% of the total N was found capable of conversion by hydrolysis into primary amines, probably with formation of acid amides. 10% of N present seems to be due to acid amides. Part of the remainder appears to consist of purine, pyrimidine, and pyridine compds. Most of the N is present in unknown compds., which may be the most important factors in plant growth. The need is great for more knowledge of the individual substances actually present in organic N material of peat and humus. W. P. G.

Alkali Soils. C. WILLIS AND J. V. BOPP. S. D. Exp. Sta., *Bull.* 126.—Analyses of alk. soils in S. Dakota are given, and remedial measures discussed. W. P. G.

A Comparative Study of the Bacterial Content of Soils from Fields of Corn and Alfalfa. H. H. WAITE AND D. H. SQUIRES. Univ. Neb. Agr. Exp. Sta., *24th Ann. Rpt.*, 160–8.—Most of the cultures isolated were acid formers. They produce oxidizing enzymes which are concerned in O fixation especially in soils rich in organic matter. They readily oxidize organic toxins poisonous to higher plants to dihydroxystearic acid and agrosterol. W. P. G

The Inhibition of Nitrification by Organic Matter, Compared in Soils and in Solutions. F. L. STEVENS AND W. A. WITHERS. N. C. Agr. Exp. Sta., *33rd Ann. Rpt.*, 36–51.—The application of Winogradsky's conclusions to the field and practices founded upon them were found unwarranted. Activity of soil bacterial should be studied under their natural environment. Even a large amt. of organic matter is not necessarily inimical to the functioning of nitrifying organisms in the field. W. P. G.

Phosphoric Acid in Soils and Fertilizers. W. B. ELLETT AND H. H. HILL. V. Polyt. Inst. Agr. Exp. Sta., *Rpt.*, 1909-10, 44–65.—It is thought that the methods generally used in the estn. of available P_2O_5 are not reliable, but no conclusions are given because of insufficient data. W. P. G.

The Fixation of Nitrogen by means of Bacillus radicicola without the Presence of a Legume. E. B. FRED. Va. Polyt. Inst. Agr. Exp. Sta., *Rpt.* 1909-10, 138–42.—These bacteria accomplish a certain amt. of N assimilation, even without the host plant. W. P. G.

The Choice of Crops for Alkali Land. T. H. KEARNEY. U. S. Dept. Agr., *Farmers' Bull.* 446.—This discusses the chem. nature of alkali, reasons for its appearance, its effect on plant growth and the crops adopted to different grades. W. P. G.

The Fixation of Nitrogen in some Colorado Soils. W. P. HEADDEN. Col. Agr. Coll. Expt. Sta., *Bull.* 178.—Expts. on the formation of nitrates in soils and their effect on plant growth are reported and discussed. W. P. G.

Bacteriological Studies of the Fixation of Nitrogen in Certain Colorado Soils. W. G. SACKETT. Col. Agr. Coll. Exp. Sta., *Bull.* 179.—Adobe shale soils, raw and cultivated, have little or no N-fixing power. Excess of nitrates destroy or limit N-fixing

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flora. *Azobacter chroococcum* appeared to be the dominant N-fixing organism, and seems to be the cause of the dark brown color of niter soils. W. P. G.

The Determination of the Absorptive Capacity of Soils by the Knop Method. M. A. EGOROV. *Russ. J. Expt. Landw.*, 12, 349–56.—From the results of the expts. here reported, it is concluded that the absorption coeff. is unaffected by the length of standing with antiseptics. $CHCl_3$ increases absorptive capacity. Without antiseptics, absorptive power varied with length of time, directly with podzol soils, inversely with chernozem and loess soils. Of the antiseptics, toluene was found the best. $CHCl_3$ did not inhibit bacterial action, nor did thymol, which increased the coeff. of absorption. The use of antiseptics with the usual Knop method is recommended to prevent errors due to differences in microflora, resulting in variations in absorption coeff. W. P. G.

The Moisture of Typical Semi-arid and Alkali Soils in Relation to their Stage of Formation. S. K. CHAIANOV. *Russ. J. Expt. Landw.*, 12, 321–48.—Changes of moisture content in virgin alkali soils were found not to extend deeper than 25 cm., the water never penetrating below the upper layers. Semi-arid soils showed variation of moisture content to a depth of 150 cm. The salt content of alkali soils continually increases, while that of semi-arid soils is decreased by movement of soil water. W. P. G.

Carbon Dioxide in Ground Air. G. I. YOUKOV. *Khoziaistvo*, 6, 37–46; through *Intern. inst. agr. (Rome), Bull. Bur. Agr. Intel and Plant Diseases*, 1911, 510–1.—The following conclusions were reached: Fallows frequently cultivated by dry-farming methods in order to maintain moisture and a high temp. in the soil, contain more CO_2 than those less cultivated. In April fallows the content of CO_2 increases during summer and reached a max. in August. This content varies according to depth between max. at 30 and 10 cm. Farmyard manure increases the content of CO_2 in the soil. CO_2 accumulates in greater quantity in the air of soils where lucerne, beets, clover, and potatoes are grown than in uncultivated soils. W. P. G.

Carbon Dioxide in Ground Air. A. SUPRUNENKO. *Zap. Novo-Alexsandri. Inst. Selsk. Khos. i Liesov.*, 21, 59–63; through *Intern. Inst. Agr. (Rome), Bull. Bur. Agr. Intel. Plant Diseases*, 1911, 511–2.—CO_2 content in soil air varies with the nature of the soil, but is never so great as to be injurious to vegetation. Light rains increase CO_2 content by causing increased bacterial and plant activity, while heavy rains have an opposit effect. It can be detd. in proportion to depth, only in fallow soils, because irregularities are caused by the position and development of roots in cultivated soils. W. P. G.

Study of Molds. A. MAZZARON. *Bull. R. Soc. Toscana Ort.*, 3, 14–23; through *Rev. gén. argon. [n. ser.]* 6, 193–5.—Physical and chem. analysis of common Italian beech, heath, black and forest molds are reported. The first 3 are rich in mineral, but poor in organic matter. Forest molds are poor in N and P_2O_5, but have a high retentive power for water. W. P. G.

Bacteriological Studies of the Soils of the Truckee-Carson Irrigation Project. K. F. KELLERMAN AND E. R. ALLEN. U. S. Dept. Agr., Bur. Plant. Ind., *Bull.* 211.—Nitrifying, denitrifying and ammonifying bacteria found throughout this region become physiologically active under favorable conditions. Conditions generally favor nitrification, as in other arid regions. No evidence of deficient nor of excessive nitrification appears. Humification studies are of the greatest importance. W. P. G.

Action of Plaster on Nitrification. SERAFINO DEZANI. *Staz. sper. agrar. ital.*, 44, 119–37.—In mineral soln. plaster has no sp. influence on activity of nitrifying microorganisms. It has no oxidizing influence. In sandy soil treated with amyl sulfate

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and plaster there was no nitrification. However, a very marked action was noted in clay soil to which plaster had been added. This is due to a physico-chem. modification of the soil. J. A. LeClerc.

Action of Chemical Substances on Germination of Seeds of Cuscuta arvensis and Cuscuti trifolii. G. D'Ippolito. *Staz. sper. agrar. ital.*, 44, 301–8.—The seeds were germinated in both sand and ordinary soil. In the case of insol. substances, *e. g.*, Ca cyanamide and MnO_2, 1% mixts. were prepared, both with sand and soil. 100 seeds were used for each test. The sand was watered with dist. water, and the soil with ordinary water. In the case of sol. substances, 1% solns. were prepared and to each test 50 cc. of each soln. resp. were added. The seeds were maintained at 28° for 10 hrs. and 20° the rest of the day. The results with nitrates were irregular except those with $Mn(NO_3)_2$ which appeared to favor the germination. MnO_2 behaved like the nitrate. Pots treated with $Ca(CN)_2$ showed no germinated seed; likewise those treated with formalin and with amyl nitrate. J. A. LeClerc.

Grass Culture. T. B. Hutcheson. Va. Polytech. Inst. Agr. Expt. Sta. *Bull.* 193.—On pp. 15–20, a number of expts. are reported showing the effect of a variety of chem. fertilizers on grasses in different parts of the state. S. C. Clark.

Lime for Agricultural Purposes. A. J. Patten and J. A. Jeffery. Mich. Agr. Coll. Expt. Sta. *Circ.* 11. S. C. C.

Effect of Fresh and Well-rotted Manure on Plant Growth. II. E. B. Fred. Va. Polyt. Inst., Agr. Exp. Sta., *Rpt.* 1909–10, 142–58.—Denitrification is most active when fresh manure is applied at seeding time. After-effects were beneficial, in most cases. Denitrifying bacteria did not affect the growth of legumes. CS_2 increased yield 100%. The effect of various bacilli on soil is recorded. Wm. P. Garrety.

Soil Improvement. P. Van Hoek and A. Rauwerda. Dept. Landb Nijv. en Handl. Verslag. en Meded. *Dir. Landb.* (*Netherlands*), 1911, 45–53.—Tests of several fertilizers showed that sea mud was better in combination with barnyard manure than with mineral fertilizers. The yield was increased as much as 40% by intensive cultivation. W. P. G.

Experiments on the Effect of Straw on the Action of the Nitrogen of Green Manures. K. Störmer. *Fühling's Landw. Ztg.*, 60, 185–98; through *Internat. Inst. Agr.* (*Rome*), *Bull. Bur. Agr. Intel. Plant Diseases*, 1911, 822–3.—Straw added to green manure reduced N efficiency the 1st yr., but gave better results the 2nd. Straw alone reduced the yield in proportion to the fineness of the straw. The yield was almost doubled by treatment the 2nd yr. with CS_2. W. P. G.

Guano Deposits of Assumption Island, Sychelles. R. Dupont. *Bull. Imp. Inst.*, 9, 39–44; through *J. Soc. Chem. Ind.*, 30, 760.—The extent and nature of this deposit are described, and its utilization discussed. The available supply consists of some 46,000 tons of high-grade, and 50,000 of low-grade guano. W. P. G.

The Pyrophosphates, New Phosphatic Fertilizers in the Cultivation of Sugar Beets. *Coltivatore*, 56, 370–2; through *Internat. Inst. Agr.* (*Rome*), *Bull. Bur. Agr. Intel. Plant Diseases*, 1910, 233.—Simple pyrophosphate containing 17% of P_2O_5 was found inferior to superphosphate in the cultivation of beets. Acid pyrophosphate containing 19% of P_2O_5 was found superior to superphosphate. In neither case was there any difference in sugar content, only the yield differing. W. P. G.

Fertilizer Experiments. P. Van Hoek and A. Rauwerda. Dept. Landb., Nijv. Handel. Verslag. Meded. *Dir. Landb.* (*Netherlands*), 1911, 1–44.—Results of very many expts. are summarized. Mineral fertilizers gave better results than stable manure. W. P. G.

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Fertilizer Experiments. W. VAN DEVENTER AND P. W. HOUTMAN. *Meded. Proefstat. Java-Suikerindus.*, 1911, 143–242.—Expts. on $(NH_4)_2SO_4$ as a fertilizer for sugar cane in comparison with various other fertilizers are reported. Heavy applications gave better results than light. K fertilizers gave little or no returns either alone or in combination with organic matter. Sand failed to improve heavy soils, which were benefitted by stable manure. Molasses fertilizers on light soils gave very good returns. Lime waste containing 60–70% of carbonate gave good results on both light and heavy soils. Soils not benefitted by heavy applications of $(NH_4)_2SO_4$ gave good results with green manure. Ashes were found beneficial to soils poor in P_2O_5, but this result is not considered conclusive. W. P. G.

New Fertilizers. M. HOFFMANN. *Mitt. deut. landw. Ges.*, **26**, 386–9.—Al-N, $Ca(NO_3)_2$, Ca cyanamide, Palmaer phosphate, Bernard phosphate, phonolite, zeolite fertilizer, and other proposed fertilizers are described and discussed. W. P. G.

Various Nitrogenous Fertilizers. G. AMPOLA. *Ann. r. staz. chim. agr. sper. Rome*, [*ser.* 2] **4**, 73–115.—$NaNO_3$, $(NH_4)_2SO_4$, Ca cyanamide and $Ca(NO_3)_2$ mixed with Thomas slag and superphosphate are discussed, and results of field expts. given. W. P. G.

Analyses and Valuations of Commercial Fertilizers. Analyses of Fertilizer Supplies, Home Mixtures and Special Compounds. C. S. CATHCART, *et al.* N. J. Agr. Exp. Sta., *Bull.* 240; cf. *C. A.*, **5**, 955, 1966.—Analyses and valuations of 368 com. brands, 32 special comps., 11 home mixts. and 177 fertilizer supplies are given. W. P. G.

Analyses of Commercial Fertilizers. H. M. STACKHOUSE. S. C. Agr. Exp. Sta., *Bull.* 160.—Analyses and valuation are given of 941 complete fertilizers, 177 cotton seed meals, 187 acids without K, 101 acids with K, 94 K salts, 87 N fertilizers, and 18 miscellaneous samples. W. P. G.

Action of Boron on Vegetation. A. ANDOUARD AND P. ANDOUARD. *Engrais*, **26**, 942–3.—B exerts a beneficial influence on and increases the yield of onions. With beans however it has a slight depressing action. E. C. LATHROP.

The Influence of Calcium Carbonate on the Action of Different Phosphates. D. PRYANISHNIKOV. Moscow. *Landw. Vers. Stat.*, **75**, 357–76.—The Ca phosphates may be divided, in regard to their fertilizing value, into 2 classes: (1) those less sensitive to the action of $CaCO_3$, mono- and dicalcium phosphates and the phosphate of Thomas slag; (2) those which show a strong depression of phosphate absorption under the influence of $CaCO_3$, tricalcium phosphate, phosphorite and bone phosphate. Only when $(NH_4)_2SO_4$ was used instead of nitric N was the addition of $CaCO_3$ favorable in all cases, and here it was least favorable with sand cultures. Phosphates of Fe and of Al showed no working depression under the influence of $CaCO_3$. In and of themselves these phosphates are somewhat easily assimilated and are gradually dissociated in the presence of H_2O; therefore they cannot play the weighty role ascribed to them in the investigations on root excretion. E. C. L.

The Use of Wastes in Agriculture. T. GRIFFET. *Engrais*, **26**, 943–5.—G. gives the analyses of a considerable number of wastes of animal, vegetable and oily origin, showing their content of N, P_2O_5 and K_2O. These analyses show that the wastes can be used to an advantage as fertilizers. E. C. L.

Catalytic Fertilizers and the Culture of Sugar Beets. G. BERTRAND. *Engrais*, **26**, 852–5, 883–5.—In the ash of the sugar beet 0.04% consists of oxides of Fe, Mn, Al, B, Zn, Cs and Rh, all in very small amts. A catalytic agent is necessary for the fixation of O in the plant. This is the role of oxidases. On ashing the oxidase of the sugar beet an ash is obtained which is relatively high in Mn. The absorption of O varies with the content of Mn. Without the presence of Mn laccase cannot function and

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hence this metal is necessary for the complete functioning of the plant. The Mn to be available must exist in some sol. form and must go into the soil soln. The addition of sol. B and Zn salts also gives good results with sugar beets. The use of Mn and Zn salts together gave most satisfactory results and shows that the use of catalytic fertilizers exerts a tremendous influence on the growth of sugar beets. E. C. L.

The Effect of Phosphorus Manuring on the Amount of Inorganic Phosphorus in Flat Turnip Roots. B. L. HARTWELL AND F. S. HAMMETT. *J. Ind. Eng. Chem.*, 3, 831.—The content of total P_2O_5 in turnips was nearly doubled by the addition to plats of a liberal amt. of acid phosphate while the content of inorg. P_2O_5 was increased about six-fold. M. X. SULLIVAN.

Nitric Nitrogen in Mixed Fertilizers. S. S. PECK. Exp. Sta. Hawaiian Sugar Planters' Assoc., Honolulu. *J. Ind. Eng. Chem.*, 3, 817–8.—A new method, embodying the Ulsch-Street and Kjeldahl methods, is given for detg. N as NH_3, sol. org. N, nitrates, and residual org. N. In comparative work with the modified Gunning method and the new method, it was concluded that the former is unreliable in the presence of much moisture and that fertilizer containing nitrate of soda and acid phosphate does not lose N as supposed even after a lapse of 4 months. M. X. S.

Manuring the Cocoa Tree and the Oil Palm in Cameroon. T. ZELLER. *Tropenpflanzer*, 15, 345–59; *J. Soc. Chem. Ind.*, 30, 912.—The cocoa tree needs lime and K and the requirements per tree are N, 56 g.; K_2O, 90 g.; P_2O_5, 120 g. For the oil palm, the requirements are N, 128 g.; K_2O, 308 g.; P_2O_5, 265 g. Wood ashes are a suitable manure for the cocoa tree. As catch crop and green manure to enrich soil in humus *Crotalaria* species were found to be the best. M. X. S.

The Control of Insects and Diseases Affecting Horticultural Crops. H. R. FULTON, W. J. WRIGHT AND J. W. GREGG. Pa. State Coll. Agr. Expt. Sta., *Bull.* 110.—A list of formulas of special sprays and the methods of application to a variety of plants. S. C. CLARK.

Corn and Cotton Wire Worm. W. A. THOMAS. Clemson Agr. Coll., S. C. Agr. Expt. Sta., *Bull.* 155.—Liberal amts. of stable manure and com. fertilizers affected corn favorably. Results with cotton inconclusive. S. C. C.

Spray Calendar. A. L. LOVETT. Okla. A. & M. Coll., Agr. Expt. Sta., *Bull.* 92.—Eighteen formulas. S. C. C.

Tomato Blight and Rot in Virginia. HOWARD S. REED. Va. Polytech. Inst., Agr. Expt. Sta., *Bull.* 192.—Soil treatment with S, CaO, manure, or com. fertilizers were ineffective. Three sprayings with Bordeaux mixt. gave perfect control although CaO-S may be equally efficient. S. C. C.

Spraying Experiments against the Rose Chafer. FRED. JOHNSON. U. S. Dept. Agr., Bur. Enton., Deciduous Fruit Insect Investigations, *Bull.* 97 (pt. III).—$Pb_3(AsO_4)_2$ is a fairly efficient check on this beetle and sweetening the As spray may help. S. C. C.

Hydrocyanic Acid Gas Fumigation in California. U. S. Dept. Agr., Bur. Entom., *Bull.* 90. **I. Fumigation of Citrus Trees.** R. S. WOGLUM. This portion of the report discusses the field work and fumigation procedure. **II. The Value of Sodium Cyanide for Fumigation Purposes.** R. S. WOGLUM. **III. Chemistry of Fumigation with Hydrocyanic Acid Gas.** C. C. MCDONNELL. S. C. C.

The "Stock" Sickness of Rye. A. SPIECHERMANN. *Landw Jahrb.*, 40, 474–515.—The sickness is due to nematodes. The best means of combatting the sickness is not to have rye follow rye but to have rye in rotation with other crops as potatoes, clover, spurry, oats, summer barley, wheat, etc. M. X. SULLIVAN.

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Bacterial Growth upon Soils Containing Calcium (KINDBORG). 11c.

U. S., 1,010,403, Nov. 28. H. S. FIRMAN, deceased, San Diego, Cal. (W. S. Firman, admr.) **Producing fertilizer material containing potash and phosphoric acid from seaweed** by causing slow combustion of the seaweed in a chamber while so restricting the admission of air and outflow of products of combustion from the chamber that the temp. is maintained at such a point that substantially all of the potash content of the seaweed is retained in the residue and the greater portion of the carbonaceous content is burned away, and subsequently treating the residue with water while the residue is still hot enough to clinker.

16. FERMENTED AND DISTILLED LIQUORS.

ROBERT WAHL.

Presence of Furfural as an Indication of Fraud in some Fermented Alcoholic Beverages. V. PASQUER AND A. CAPPA. Ist. chim. farm. Genova. *Gazz. chim. ital.*, **41**, II, 349–58; cf. *Atti soc. lig. sci. nat.*, **20**, (1909).—Of a sample of beer, 1 portion was distilled directly, a 2nd after neutralization with a paste of $MgCO_3$, a 3rd after neutralization and addition of caramel, and a 4th after neutralization and addition of com. alc. containing furfural. Distillate (1) gave a faint furfural test with $PhNH_2.AcOH$, (owing to the action of free acids and heat on the carbohydrates), (3) and (4) gave strong tests, while (2) gave negative results. A no. of other beers and red and white wines were similarly neutralized and distilled, and whenever furfural was detected in the distillate it was found, by other methods, that the beverage had been adulterated with caramel or otherwise manipulated. CHAS. A. ROUILLER.

The Principles of Wine-making. F. T. BIOLETTI. California Coll., Agr Expt. Sta., *Bull.* 213.—This treats of the nature of wine, the biological theory of wine-making, the microörganisms found on grapes, those found in wine, and their control. WM. P. GARRETY.

The Disease Causing Bitterness in Wine and its Relation to the Acrylic Fermentation of Glycerol. E. VOISENET. *Compt. rend.*, **153**, 898–900.—The acrylic fermentation of glycerol is at least one of the important changes taking place when wine turns bitter, and the immediate or secondary products formed suffice to explain the phenomena which are directly observed in the course of the disease. The conclusion arrived at connects the most salient cause and effects, the relation of the enzyme to the taste and is in contradiction to the supposition of Wortmann, who refutes the opinion of Pasteur and attributes the cause of sickness, otherwise hypothetical, to the action of divers molds, whose different enzymes are supposed to attack the tannin and coloring matter and transform these into bitter substances. C. A. NOWAK.

17. PHARMACEUTICAL CHEMISTRY.

VIRGIL COBLENTZ.

The Accelerating Action of Hydrochloric Acid upon the Starch-converting Properties of Pancreatin and Malt. A. ZIMMERMAN *J. Ind. Eng. Chem.*, **3**, 823–6.—Tables showing action of pancreatin and malt under diff. conditions, and the comparative diastatic action of each, with brief outline of methods by which data was obtained. H. S. BAILEY.

The Proposed Deletions from the Pharmacopeia. TORALD SOLLMANN. Cleveland.

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Clev. Med. J., 10, 920–7.—S. explains the general significance of the report of the pharmacopeial committee with special reference to the proposed deletions.

P. J. HANZLIK.

The Gravimetric and Volumetric Estimation of Ammoniated Mercury. S. A. SUTTERHEIM. Rhoon. *Pharm. Weekblad*, 48, 1085–7.—*Gravimetric:* Dissolve ±0.1 g. NH_2HgCl + 0.5 g. KCN in a few cc. H_2O; this results in the formation of $Hg(CN)_2$; then add 5 cc. NaOH soln. and boil till free from NH_3; add 10 cc. HCHO and warm for a time, when the oxide is reduced to free Hg. (This last reaction may be carried out in a centrifuge tube.) Centrifuge and wash ppt. with alc. and ether. Dry and weigh. *Volumetric:* To ±0.2 g. of finely powdered salt add 3 cc. NaOH soln. and 5 cc. H_2O., boil on bath till free from NH_3, cool, add excess of 0.5 *N* KCN (6 cc. per 0.1 g. salt) and when dissolved, add phenolph. and HNO_3 till faintly alk.; titrate excess KCN with 0.1 *N* $AgNO_3$ added drop by drop. 1 cc. 0.1 *N* $AgNO_3$ = 0.00054 g. HCN. Quantity HCN found: x 200/54 = amt. Hg. No data as to accuracy.

V. E. HENDERSON.

The Estimation of Hydrastine in Extract of Hydrastis. J. S. MEULENHOFF. *Pharm. Weekblad*, 48, 1126–31.—Criticism of various quant. methods with analyses showing the quant. effects of various modifications. M. prefers the method of Rusting-Smeets and shows the necessity of acidifying with plenty of HCl and of using a petroleum-ether with a b. p. of 60–80°. The method recommended is as follows: Add water to 30 g. ext. and evap. to drive off alc.; then add HCl in quantity to 120 cc. and subsequently NH_4OH; to 50 g. of soln. add 125 cc. ether, shake, add 125 cc. petrol-ether + tragacanth and shake. Take 230 cc. ether-petrol-ether mixture, and distil off ¾. Hydrastine crysts. out. The amount left in the ether mixt. equals only 0.06%.

V. E. H.

Datura arborea, Linn. ANON. Instituto medico nacional. *Anales inst. med. nacional*, 11, 421–42.—A botanical description of the plant is given. The % comp. of the leaves is *viz.*: Resins, 4.72; oil, chlorophyll and caoutchouc, 2.08; tannic acid, 1.30; glucose, 1.00; gums, 9.70; dextrins, 2.20; cellulose and ligneous tissue, 53.34; mineral salts, 15.80; atropine, 0.02; hygroscopic H_2O, 98.40. The comp. of the flowers and root is similar; the root contains slightly more atropine than the leaves and flowers. The comp. of the Et_2O, petroleum Et_2O, alc. and H_2O exts. is practically the same for leaves, flowers and root. Atropine can be extracted by any of the methods used for its extraction from belladonna, but there is danger of considerable loss owing to intimate mixt. with resins and glucose. The method of extraction which gave the best results is described in detail. An account is given of expts. testing the physiological action of aq. and alc. exts. of the plant.

H. S. PAINE.

The Presence of Manganese in Digitalis purpurea. J. BURMANN. *Bull. soc. chim.*, 9, 957–9.—Mn is present in the leaves or preps. of *D. purpurea*, but not in those of *D. ambigua* or *D. lutea*. This bears out our knowledge of the influence of the chem. constituents of the soil on the geographical distribution of these plants. *D. purpurea* needs a soil containing Mn. It flourishes best in mountainous regions containing ferruginous sandstone rich in Mn. By ashing several g. of the powd. leaves in a Pt crucible the Mn will form manganates with the alkalies present, and, on cooling, the mass will take on the characteristic blue or greenish blue color. On slightly acidifying this residue, the violet color of the permanganates develops instantly and intensely. This reaction is characteristic of the official *D. purpurea* only. WALTER REGNAULT.

Clavicepsin. New Glucoside of Ergot. F. MARINO-ZUCO AND V. PASQUERO. Ist. chim. farm., Genova. *Gazz. chim. ital.*, 41, II, 368–74.—The alc. ext. of ergot is evapd. to dryness and taken up with H_2O, whereupon a part dissolves and the soln.,

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after repeated b. with charcoal, deposits slowly the glucoside *clavicepsin*, $C_{18}H_{24}O_{10}\cdot 2H_2O$, acicular, probably trimetric crystals, usually showing the forms *a* (100) and *b* (010), m. 91° and (anhydrous) 198°, very sol. in H_2O, very slightly in abs. alc. and not at all in Et_2O, C_6H_6 or $CHCl_3$; its solns. do not reduce hot Fehling's soln. but mineral acids hydrolyze it to 2 mols. glucose and 1 mol. mannitol; $[\alpha]_D^{20}$ 142.27°.

CHAS. A. ROUILLER.

Aromatic Extract of Cascara Sagrada. R. C. COWLEY. *Chem. Druggist*, 79, 115–6.—Acidity of an aq. ext. of the bark increases with age and also on addition of emulsin. This points to the presence of a fermentable glucoside. It is possible that $CHCl_3$ also increases the velocity of glucoside decomp. If the activity of the drug is due to the action of the glucoside decomp. products, the change ought to be quickly accomplished by dil. H_2SO_4. A. VORISEK.

Estimation of Pyrogallol in a Hair Dye. M. S. SALAMON AND W. M. SEABER. *Chem. Druggist*, 79, 419.—To sep. pyrogallol, a portion of the sample which contained Henna ext. was first extracted with EtOAc and the ext. evapd. to near dryness. Out of this residue a mixt. of petroleum ether and $CHCl_3$ (9 : 1) dissolved the pyrogallol. Good results were obtained with prepared samples. A. V.

The Essential Oils of the British Pharmacopeia. E. J. PARRY. *Chem. Druggist*, 79, 450–1.—Ammendments to the monographs of the Pharm. Committee on a number of the oils, and the acetylation process. A. V.

Dutch Medicins. W. FROEMBLING. *Chem. Druggist*, 79, 451–2.—The origin of some medicins used in Cape Colony and the derivation of some of their names are traced. No uniformity exists as nearly everything bearing a Dutch label is regarded as Dutch medicin. A. V.

Analysis of Essential Oils. E. J. PARRY. *Chem. Druggist*, 79, 608.—A criticism of the new method of analysis by means of miscibility curves (M. E. Louise, *C. A.*, 5, 2982). The method is declared unscientific and totally useless. A. V.

Assay of Strophanthus and Tincture of Strophanthus. A. GARDNER. *Drug. Circ.*, 55, 403.—The fat and resin-free drug and a tincture prepared from it were assayed. Evap. 10 cc. of tincture to a soft ext., treat with 3 portions (10 cc.) of 95% acetone, and percolate this soln. successively through 3 funnels containing layers of cotton, sand, sand animal charcoal, and sand. Follow with acetone until all bitter taste is removed and let evap. spontaneously. The residue is washed with 10 cc. Et_2O, dried at 43.5° and weighed as strophanthin. The tincture gave 0.79–0.826 g. per 100 cc. The drug was extracted with acetone and the liquid treated as the tincture. Av. = 10.55%. The product could be changed into strophanthidin only by stronger HCl. A. V.

Strychnine Arsenite and Morphine Sulfate. H. ENGELHARDT AND H. W. JONES. *Drug. Circ.*, 55, 555.—An excess of As_2O_3 was found in the strychnine arsenite of the market; the samples examd. contained 69.2–75.65% of strychnine as against 86.1% in $(C_{21}H_{22}N_2O_2)_2HAsO_2$ (Mercks Index) and 77.1% in $(C_{21}H_{22}N_2O_2)As_2O_3$, (Hager). Samples of morphine sulfate were found to contain from 1.45–3.97% of other alkaloids, chiefly codeine. The U. S. P. standard should be made stricter. A. V.

Elixir of Iron, Quinine and Strychnine Phosphate. R. J. FRITZINGER. *Drug. Circ.*, 55, 685.—To prevent a loss of alc. and make filtration more rapid in the prep. of the elixir, unfiltered aromatic elixir should be used and the mixt. allowed to stand over night or longer. No talcum is needed. Overheating and the use of an excess of alkali should be guarded against. A. V.

Standardization of Analytical Methods. J. C. UMNEY. *Perf. Ess. Oil Record*,

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2, 249.—The establishing of standard methods for exam. of essential oils is urged, especially as to the adoption of fixed temp. for optical rotation and refractive indices, the sulfite or bisulfite method for aldehydes phenols detn. by alkali absorption, and the deduction of acid value from the sapon. no. of ester-containing oils, notably oil of bergamot, as well as certain special processes. A. V.

Ambergris. C. TREATT. *Perf. Ess. Oil Record*, 2, 252.—The source, manner of formation, collection and some properties of the substance are described with notes on "some lumps of ambergris" by R. C. Treatt. A. V.

Oil of Pennyroyal. E. M. HOLMES. *Perf. Ess. Oil Record*, 2, 254–5.—Treats mainly of the plants that yield the European and American oils. The common oil contains 80% (16% Parry) of pulegone, some menthol, methone, *l*-limonene and dipentene. The Russian oil has an odor resembling peppermint and spearmint and may contain carvone. The Am. oil consists of 30% of pulegone, 50% *l*-menthone and *d*-isomenthone, 8% *l*-Me-3-cyclohexanone with minute quant. of an undetd. phenol and the esters of HCOOH, AcOH, decylic and salicylic acids, an undetd. dibasic acid and some terpenes. A. VORISEK.

Adulterated Mandarin Orange Oil. E. J. PARRY. *Perf. Ess. Oil Record*, 2, 257.—The adulterated samples varied chiefly in their optical rotation from the values for pure oil, which is +67–73° (Berté). One gave lower, two others higher values. A. VORISEK.

The Cultivation of Caraway in the Netherlands. P. VAN DER WIELEN. *Perf. Ess. Oil Record*, 2, 261–2.—An abstract of a lecture. A. V.

Costus Root. J. C. UMNEY. *Perf. Ess. Oil Record*, 2, 263.—Notes on the drug and its volatil oil as perfumes. A. V.

Citrus Oils in the Philippine Islands and the Essential Oils of Clausena anisum-olens Bl., and Ocimum sanctum. B. T. BROOKS. *Perf. Ess. Oil Record*, 2, 264–5.—Sweet orange-peel oil was prepd. by squeezing from both the cultivated varieties, namely the naranjita and the cajel, the yield being 50 g. per 100 fruits. Sapon. no. 8.0, $[\alpha]_D^{30}$ 90.85°, n_D^{30} 1.47. On standing a few days 0.3% of a cryst. wax-like substance deposited. The residue on spontaneous evapn. was 2.4%. After this was recrystallized from alc. the product m. 116–7°. Limonene content 92%. The leaves of *Citrus decumana*, Murr., yield by steam destillation 1.7% of an oil which is extremely fragrant; d_{30} 0.87, ester no. 10.0, $[\alpha]_D^{30}$ 22.9°, n_D^{30} 1.4644. The oil is miscible with 70% alc. and contains traces of citral; 35% b. 174–6° and consisted chiefly of dipentene, 15% b. 195–200°, contained linaloöl. The odor suggests presence of Me-chavicol. The leaves of *Toddalia aculeata* yield on steam distillation 0.08% of an oil of strong camphoraceous odor. By freezing at —15°, 18% of a very volatil, unstable cryst. solid were obtained which, recrystallized from ligroin, m. 96.5–7.0. *Clausena anisum-olens*, Bl. The leaves are used for making liqueur similar to anisado. By steam 1.15% of an oil was obtained having a faint odor of anis, d_{30} 0.963, $[\alpha]_D^{30}$ 0.0, n_D^{30} 1.5235, sapon. no. 3.6. Most of it b. 212–16°, consists of nearly pure Me-chavicol. The oil of *Ocimum sanctum*, L., has an odor different than Me-chavicol which it contains. On distillation 18% b. below 205°, 52% at 205–15°, the rest up to 250°, the non-volatil residue being 3.6%. Cineole and linaloöl were identified. A. V.

Reactions of Stannous Chloride and Potassium Acetate with Caramel and Mallow Color. A. STRAUB. *Pharm. Zentr.*, 52, 868.—*1. Caramel:* Add 3 cc. of 1% $SnCl_2$ soln. and 0.5 g. of KOAc. to a light yellow soln. of caramel and heat until a flaky ppt. seps. The ppt. holds the caramel color. *2. Mallow flowers:* To an aq. ext. of the flowers having the color of a red wine, add 5 cc. of 1% $SnCl_2$, 2–3 g. of KOAc and heat; a green-blue ppt. seps. A mixt. of mallow color and red wine should be dild. with 8

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pts. of H_2O, 1 cc. of $SnCl_2$ soln. and an excess of KOAc added to 25 cc. of the dild. sample. On warming only the coloring matter of the wine is pptd. When this has been completely removed with more $SnCl_2$, the filtrate will give the characteristic green-blue ppt. with $SnCl_2$. A. V.

Chemistry of Tuberculin (LOCKEMANN). 11c. Alkaloid Content in Chinchona leaves (LEERSUM). 11d.

U. S., 1,010,177, Nov. 28. F. RASCHIG, Ludwigshafen a/Rh, Ger. **Making alkaline earth salts of hydroxylaminedisulfonic acid** by causing a nitrite and bisulfite and SO_2 to act upon one another in the cold in proportions indicated by the equation $Ca(NO_2)_2 + Ca(HSO_3)_2 + 2SO_2 = 2HON(SO_3)_2Ca$, the SO_2 being added to the previously mixed nitrite and bisulfite.

U. S., 1,010,405, Nov. 28. F. HOFMANN AND L. TANK, Elberfeld, Ger. Assignors to Farb. vorm. F. Bayer & Co., same place. **Producing erythrene** by heating cyclohexanol to above 500°.

U. S., 1,010,447, Dec. 5. J. NERKING, Düsseldorf, Ger. Assignor to Chem. Fab. Reisholz, G. m. b. H., Düsseldorf-Reisholz, Ger. **Making harmless combinations of thiocyanic acid** for medicinal use by adding an alc. soln. of a thiocyanate to an albumin soln., thickening the mass by evapn. *in vacuo* and drying.

U. S., 1,010,598, Dec. 5. H. DECKER, Hanover, Ger. Assignor to Farb. vorm. F. Bayer & Co., Elberfeld. **6,7-Methylenedioxy-3,4-dihydroisoquinoline**, a white powder, m. 90–91°, sol. in alc. and ether, insol. in ligroin, converted by treatment with ICH_3 into the iodohydrate of hydrastinine m. at 234°; made by treating the formyl compd. of homopiperonylamine with P_2O_5.

U. S., 1,010,797, Dec. 5. M. F. PORTER, New York, N. Y. **Insecticide** consisting of gasolene 1, CCl_4, 2.94, terpineol 0.03 and oil of cedar 0.03 parts by vol.

U. S., 1,011,075, Dec. 5. J. NERKING, Düsseldorf, Ger. Assignor to Chem. Fab. Reisholz. **Making a harmless combination of thiocyanic acid** for medicinal use, by adding an alc. soln. of a thiocyanate to a soln. of albumin, pptg. thiocyanate of albumin by alc., sepg. the sediment by pressing, and drying.

U. S., 1,011,076, Dec. 5. *Idem.* **Making a harmless combination of thiocyanic acid** for medicinal use by dissolving about 2 kg. albumin in 5 kg. H_2O, adding 4–5 kg. NH_4CNS, sepg. the sediment by pressing, washing the sepd. mass with a little alc. and drying it.

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18. ACIDS, ALKALIES, SALTS AND SUNDRIES.

T. LYNTON BRIGGS.

The Manufacture of Sulfuric Acid by the Contact Process. MAURECOURT. *Engrais*, 26, 910–4.—A review of different methods. E. C. LATHROP.

The Absorption of Hydrochloric Acid and other Gases. PERCY C. KINGSBURY. *Met. Chem. Eng.*, 9, 611.—The Cellarius tourill, in which the gases are absorbed, is described, comparison being made with the spherical carboy type. The arch-shaped vessel has a number of advantages over the spherical form. It can be completely immersed in water and thus cooled, increasing its efficiency; it offers a much larger cooling surface in comparison with the vol. of acid it contains, besides exposing a larger surface of the absorbing liquid to the action of the gas. The tourill withstands variations of temp., the double arch enabling it to take up considerable strain due to ex-

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pansion and contraction of the material. The acid connections being under the surface of the liquid prevents the possible stoppage of the flow due to the formation of air locks. WILFRED W. SCOTT.

The Oxygen-Gasoline System of Lead Burning. ANON. *Met. Chem. Eng.*, 9, 612.—A description of the Howard system of "Pb burning," a process involving the use of O gas satd. with gasoline in place of H and air as commonly employed. The app. is simple and easily repaired. The 2 principal parts the gasoline saturator and the O cylinder together weigh less than a 100 lbs. The flame is clean and is hotter than that produces by the H and air flame. The Howard system of Pb burning is being introduced by the Linde Air Products Co. of Buffalo, N. Y. W. W. S.

Novel Device for the Glover and Gay-Lussac Towers. ANON. *Met. Chem. Eng.*, 9, 613.—A new feeding device built by the Steinzeugwaaren Fabric f. Canalisation u. Chem. Ind. i. Friedrichsfeld. "Its chief advantages are that there are no valves nor other movable parts in it, that the liquid is distributed absolutely uniformly over the whole cross-section of the tower, and that only one opening in the top of the tower is required." Description of the app. with cut given. W. W. S.

Report of Committee on Standard Specifications. H. J. SKINNER. *J. Ind. Eng. Chem.*, 3, 860–3.—Report of the sub-committee on bleach and solder specifications. W. W. S.

The Decomposition of Commercial Iron and Manganese Borides by Water. J. HOFFMANN. Vienna. *Chem. Ind.*, 34, 241–3.—Goldschmidt's com. borides of Fe and Mn which had previously been shown to be solid solns. are slightly affected by moist air or dist. water. The gas evolved is mainly H with a little B hydride, but not enough to render transportation dangerous as with Fe-Si even if B hydride were spontaneously inflammable like Si hydride. C_2H_2 is not evolved. With Mn boride, $Mn(OH)_2$ is produced and air oxidation changes this to Mn_2O_3. J. R. WITHROW.

Sulfate Manufacture in Scotland. ANON. *J. Gas Lighting*, 116, 249.—A paper dealing with the utilization of shale for $(NH_4)_2SO_4$ manuf. in connection with the mineral oil trade of Scotland. C. A. COLE.

U. S., 1,010,222, Nov. 28. B. BORZYKOWSKI, Charlottenburg, Ger. **Making artificial bristles** by treating vegetable fiber such as ramie, sawdust, cotton, flax, or jute with H_2SO_4, HOAc or NHO_3, dropping the viscous mass into a setting soln., *e. g.*, H_2O, alc. or benzine, drying the hardened mass and then obtaining shavings therefrom for forming bristles.

U. S., 1,010,404, Nov. 28. A. R. FRANK, Spandau, Ger. **Apparatus for producing nitrogen compounds from carbides,** *e. g.*, $CaCN_2$ from N and CaC_2, comprizing a vessel for holding the carbide, a N-supply thereto, a device for maintaining a passage through the vessel and carbide and a resister to heat the carbide and N to reacting temp.

U. S., 1,010,768, Dec. 5. A. S. ISAACS, Pittsburgh, Pa. **Heat-producing element** comprizing a block of Al and dry caustic alkali to which H_2O is added at the time of use.

U. S., 1,010,869, Dec. 5. E. M. DAVIDSON, New York, N. Y. Assignor to Pyrene Mfg. Co. **Fire-extinguishing liquid** containing CCl_4, CO_2, NH_3, $PhNO_2$ and oil of amber; cf. *C. A.*, 5, 2919.

U. S., 1,010,870, Dec. 5. *Idem.* **Extinguishing fires** by enveloping the burning material with a lingering, cohering blanket of dry, combustion-arresting gas which also penetrates the burning mass, produced by volatilization of liquid applied to the fire, *e. g.*, a soln. containing CCl_4, CO_2, NH_3, $PhNO_2$ and oil of amber.

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U. S., 1,011,014, Dec. 5. O. BENDER, Potsdam, Ger. **Producing oxides of nitrogen** by burning fuel-gas in the form of small pointed flames, supporting combustion by a mixt. of O and air containing 50–90% O in such proportion that the resulting gases contain 10–50% free O, and cooling the reaction gases below 100° to condense the H_2O formed (cf. *C. A.*, 5, 1665, 1667).

19. GLASS AND CERAMICS.

G. E. BARTON, A. V. BLEININGER.

The Testing of Glass. H. SCHNURPFEIL. *Glashütte*, 41, 906–7.—A brief summary of the methods for testing the weathering qualities of glass. J. B. PATCH.

The Deposition of Crystals upon Plates and other Forms of Glass. B. *Glashütte*, 41, 931–2. J. B. P.

How Much of the Heat Applied to Enamel Firing and Melting Ovens is Useful? PH. EYER. *Glashütte*, 41, 909–11, 953–5; (4 figs.).—E. describes an oven which he has designed and for which he claims superior heat economy. J. B. P.

"Petinetglas." JOH. MANG. *Glashütte*, 41, 994–5.—Two forms of "Petinetglas" are mentioned, one having a network appearance caused by twisting a cylinder of glass as it is drawn and fitting over it another cylinder twisted in the opposit direction. The second variety seems to have coins or medals embedded in the glass but in reality the coins are molded of clay or porcelain which in colorless glass give a silvery luster and which resemble Au when placed in a yellow glass. The apparent luster is caused by a thin film of air upon the surface of the object. J. B. PATCH.

Attaching Permanent Labels to Glass. M. *Diamant*, 33, 1016.—A paste of glue 100, Venetian turpentine rosin 3–4, and paraffin 1 is used, rendering the paper translucent and also protecting it from liquids, meeting the requirements for reagent bottles. The mixt. must be applied hot and dries slowly. A soln. for the same purpose consists of Canada balsam 5, Venetian turpentine rosin 1/2, rectified turpentine oil 15–20. J. B. P.

Asphalt Coatings and the Etching of Glass. F. M. K. *Diamant*, 33, 979–80. J. B. P.

Gold and Copper Ruby Glasses for Flashing. SCH. *Glashütte*, 41, 973–4.—S. describes the process of flashing. J. B. P.

Practical Hints for the Melting of Glass. SCH. *Glasshütte*, 41, 949–50. J. B. P.

The Draught Indicator and Pyrometer in Glass Factory Practice. KAL. *Glasind.*, 22, Nos. 44–5. J. B. P.

The Distribution of the Flames in Glass Furnaces. ANON. *Sprechsaal*, 44, 640–1; (2 figs.). G. E. BARTON.

The Casting of Glass House Pots Especially with Reference to the Large Pots Used in the Manufacture of Plate Glass. HUGO KNOBLAUCH. *Sprechsaal*, 44, 672–3, 684–5. G. E. B.

The Function of Chromium Trioxide in Glazes. E. BUETTNER. Bunzlau. *Sprechsaal*, 44, 669–73.—The starting point of the work was the red flux of the comp.: 0.9 PbO, 0.1 K_2O, 0.2 CrO_3, 0.6 SiO_2. It was found immaterial what the constituents were as long as this comp. resulted. The best CrO_3 content varied from 0.15 to 0.30. The replacement of PbO by K_2O, MgO, CrO and BaO tends to change the chrome-red to brownish shades. The limiting SiO_2 content seems to be about 1 equiv. Be-

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yond this the characteristic green appears. B_2O_3 additions appear to operate like bases would. SnO_2 increases the viscosity and changes the red color to brown. Al_2O_3 in slight amts. does not disturb the red color. The fritts are more or less sol. in H_2O, but no regularity was observed in this connection. A. V. BLEININGER.

20. CEMENT AND OTHER BUILDING MATERIALS.

C. N. WILEY.

White Cements. MÜRMANN. **"Stern" Cement.** TOEPFFER. *Tonind. Ztg.*, 35, 1370.—The demand for white cement has led to many products, but the most satisfactory is the "Stern" brand, a cement from very pure materials. Its chief drawback is its very slow initial set. T. claims that an equally good result may be obtained with an ordinary cement, using very white sand. W. L. BADGER.

New Experimental Results in Cement and Artificial Stone Practice. MÜLLER. *Tonind. Ztg.*, 35, 1370.— There is a limit to the fineness desirable for Portland cement, because of the increased rapidity of setting. For oiling forms, linseed oil affects the strength, while acid-free machine oil up to 2% has no effect. If Portland cement is not used till $^1/_2$ hr. after wetting up, the bonding strength decreases $^1/_3$. Ba salt is the best filler for cement. W. L. BADGER.

Hydration and Hardening of Cement. ROHLAND. *Tonind Ztg.*, 35, 1371.—Polemical against Michaelis (*C. A.*, 5, 1328). W. L. B.

Setting of Lime Mortars with Periodical Wetting. H. BURCHARTZ. *Tonind. Ztg.*, 35, 1278–80.—Tests were made on cubes of 1 : 3 limesand mortars; some were kept in the open air of the room, and others moistened at intervals of 1–4 weeks. The moistened mortars had a considerably higher strength than those kept dry, the tensil strength of the moistened ones reaching a value twice that of the dry ones in 6 months and remaining const. up to 5 yrs.; the crushing strength of the wetted mortars was 150% of the dry at the end of 6 months, and increased regularly to 180% at the end of 5 yrs. The wetted mortars had a higher CO_2 and a lower hydrate-water content—6.7% CO_2 against 4.8% for the dry and 0.6% H_2O against 1.3% for the dry. The difference, both in strength and in comp., was noticeable at the end of 1 month. The relation of CO_2 to strength is not a regular one. The more rapid hardening of the wetted mortars cannot be due to a hydraulic action, because of the low H_2O content. The more rapid and more complete absorption of CO_2 is responsible for the beneficial effects of periodic wetting. W. L. BADGER.

Protection from Fire and Water by Gypsum Flooring. ANON. *Tonind. Ztg.*, 35, 1372. W. L. B.

Preservation of Mine Timbering. F. A. A. *Rass. min.*, 35, 228–30.—Brief description, with illustrations, of the Kruskopf process. CHAS. A. ROUILLER.

Bituminous Pavement Definitions. ANON. *Municipal J. Eng.*, 31, 469.—Definitions for sheet asphalt, bituminous concrete, bituminous macadam and oiled or tarred macadam., reported to the Am. Soc. Municipal Improvements. A. J. PHILLIPS.

Use of Tar on Roads in Kent. ANON. *J. Gas Lighting*, 115, 820.—Statistics dealing with the amt., quality and price of tar and pitch used on the roads of Kent, Eng. during 1910–11. C. A. COLE.

U. S., 1,010,122, Nov. 28. J. A. DE CEW, Montreal, Canada. **Preserving wood by treatment with waste sulfite liquor under the action of heat and pressure.**

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21. FUELS, GAS AND COKE.

J. D. PENNOCK.

A Continuous Carbon Dioxide and Temperature Recorder and its Application to Combustion Efficiency. Ed. A. Uehling. *Met. Chem. Eng.*, 9, 656–8.—Formulas are given to show that waste heat in the chimney is dependent on 2 factors, *viz.:* Temp. of flue gases and % CO_2. An illustration and description of an app. for recording the above is given on p. 281 of above J. C. A. Cole.

Flameless or Surface Combustion. J. B. C. Kershaw. *Met. Chem. Eng.*, 9, 628–30.—The method depends upon the fact that under certain conditions a mixt. of a combustible gas and air (in proper proportion) when forced into contact with a heated porous and refractory material or metal, the mixt. can be burned without the production of any flame and maintain a very high temp. Thermal efficiency of 90–95% has been attained with all varieties of fuel gas. Illustrated. C. A. Cole.

Utilization of Low-value Fuels at the Mines of the Upper-Mining-Office District, Dortmund. O. Dobbelstein. *Stahl u. Eisen*, 31, 924–8.—The materials fall into 3 classes: (1) Coarse material with an ash content up to 50% and H_2O up to 20%, such as cull coal, top coal and coal from poor veins, and intermediate products from the washers; (2) fine-grain material with ash up to 40% and H_2O 30%, dust and silt coal; (3) coke fines, so-called coke ashes of all sorts from the quenching process for coke and fines from coke breakers, ash up to 30%, water up to 20% and a gas content of from 1 to 15%. Results on the utilization of these materials at different mines using various types of generators are recorded. E. J. Witzemann.

Coal Storage. E. A. Harman. *J. Gas Lighting*, 116, 304–8.—H. finds that the deterioration of coal on stocking is greatest when the coal is first put into pile, and gradually decreases until after a period of time it is practically negligible. It is therefore best not to keep changing the stock pile, but to leave the old coal in stock as long as it is necessary to carry any pile at all, and to use the fresh coal for current consumption. C. A. Cole.

The Basis of Coal Purchases. Anon. *J. Gas Lighting*, 116, 243.—The simplest method of purchase would be that of contracting for the coal which after trials with other deliveries of coals all suiting the conditions of use, afforded the greatest number of heat units per unit of cost: (B. t. u. per ton)/(Cost in c per ton). C. A. Cole.

The Testing of Transvaal Coals. M. Thornton Murray. *J. Chem. Met. Min. S. Africa*, 12, 92–6.—*Discussion:* J. Moir stated that sampling coals was so difficult that he would challenge any expert sampler to sample a 100-ton lot thrice in succession, and obtain 3 samples differing by only 0.5%. Samples only air-dried should not be used for calorimetric tests. The suggestion is made to dry the 60-mesh sample at 60–70° for 2 hrs. The current beliefs about oxidation or evolution of volatil matter at those temps. are superstitious. Why should any allowance be made in the ash for FeS and $CaCO_3$? These substances burn in the same way on the large scale as in proximate analysis. As to ultimate analysis, he has found a uniformity of comp. as in the organic part of local coals, expressed by the formula: Calorific value = 100—A/K where A = ash and K is a const. for each coal field. So far as he has applied it, the formula shows no greater difference than 2%, usually much less. The S correction may be neglected since the Fe in pyrite goes to $FeO(FeSiO_3)$ in the bomb, but to Fe_2O_3 in the furnace—the one practically cancelling the other. In technical work thermometric readings need not be closer than to 0.005 or even 0.01°. The Beckman thermometer is liable to "lag" in quickly varying temps., and therefore is not so ideal

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for bomb tests. To find the radiation loss closely enough for technical work, take at least 7 readings at 1-min. intervals. From the last 4 intervals obtain the *final* rate, and multiply this by the number of intervals between firing and the max. A further small correction should be made by deducting 20 cal. from the result. A. McA. Johnston gave the detailed results of moisture detns. on 4 different coal samples. *A* dried ½ hr. in hot water oven, cooled in a desiccator over H_2SO_4, and weighed without cover. *B* dried in the same way, and cooled in stoppered weighing tubes. *C* moisture detd. directly by absorption in U $CaCl_2$ tube. The results in *A* were 0.2–0.4 less than in *B*, which again were 0.02–0.06 less than in *C*. J. A. Wilkinson contended that making tests on samples of coal which had been submitted to conditions not obtained in practice, was a mistaken procedure. E. WALLER.

Some Principles of Condensation with Especial Reference to Water Gas. L. E. WORTHING. *Progressive Age*, 29, 911–4. C. A. COLE.

Producer Gas from California Crude Oils. E. C. JONES. *Chem. Eng.*, 14, 452.—Crude oil in cal. has entirely superseded all other raw materials in the illuminating-gas industry and the use of oil in producers for power purposes is being advanced. Making producer gas from oil in the ordinary gas generator offers advantages in flexibility and continuity of operation. The repairs are low and there are no by-products to be disposed of. E. C. SCOTT.

Photometry of Large Light Sources. G. H. STICKNEY AND S. L. E. ROSE. *Am. Gas. Light. J.*, 95, 210–5.—A paper prepared for the 5th Conv. Illuminating Eng. Soc. C. A. COLE.

Recent Efforts in the Utilization of Gases in Iron Smelters and Coke Works. F. W. LÜRMANN. Berlin. *Stahl u Eisen*, 31, 913–21.—The paper is full of statistical matter (based on operating results in the Rhine-Westphalia region) concerning the costs in utilizing gas from various sources in smelters and coke works to the best advantage. L. recommends heating the coke ovens with gas obtained by treatment of coke ashes and dust, etc., in "blast furnace" gas generators as the most economical for illuminating gas supply, etc., for cities. E. J. WITZEMANN.

New Processes for the Absorption of Ammonia in the Manufacture of Coke and Lighting Gas. MAIZIÈRES. *Engrais*, 26, 936–9.—A description of the processes of Burkheiser and Kopper, which depend on the absorption of NH_3 by H_2SO_3 forming $(NH_4)_2SO_3$ which is later partially oxidized to $(NH_4)_2SO_4$. The $(NH_4)_2SO_3$ may be used as a fertilizer. E. C. LATHROP.

Phosphorus in Coking Coal. C. CATLETT. *Bull. Am. Inst. Min. Eng.*, 59, 901.—In outcrops of coal a few miles west of Columbiana, Ala., minute veins of a resinous-looking substance were identified as evansite ($Al_6P_4O_{14}.18Aq$). C. concludes that any coal which shows to the eye the occurrence of a light colored resinous-looking material should be looked upon with suspicion as being high in P. C. A. COLE.

The Chemistry of Coking. W. HEMPEL AND F. LIERG. *Z. angew. Chem.*, 24, 2044–6.—The assumption that coals in general possess a coking property is too sweeping. Coals of certain quality make good, hard, serviceable coke; others do not. It is not known why some coals on dry distillation yield hard coke, while others disintegrate into powder. Wedding has advanced the theory that in some coals there are present certain tar-like compds. of C, H and O which at high temps. decompose into volatil constituents and C, the latter serving as a binding material for the rest of the C, with the result that a mass of coke of semi-fused appearance is produced. The peculiar hardness of coke appears to be intimately connected with another of its properties, its capacity of being converted into graphite. Hempel, Markert and others attribute the formation of graphite to the intermediate formation and breaking down

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of carbides and silicides at a high temp., the necessary Fe and Si being present in the coke. At the high temp. of the coke ovens all SiO_2 and Fe_2O_3 originally present in the coal are reduced to Si and Fe, and these then form carborundum and Fe-Si, both of which are extremely hard. The silvery gray appearance and metallic ring of the best cokes are traceable to the same source. If it were possible to make a complete proximate analysis of coke in such a way as to prove the actual presence of Si not as SiO_2 but as a silicide, the correctness of this theory would be established.

G. N. TERZIEV.

Soot: Its Quantity, Nature and Effect. J. B. COHEN. *Chem. Trade J.*, 49, 522.—Soot consists mainly of C, tar, and mineral matter. The tar causes it to adhere like varnish and the small % of H_2SO_4 renders it slightly acid. Domestic soot contains larger % of tarry matter and domestic chimneys yield 8–12% more soot than the discharge from industrial chimneys. The soot in suspension depends largely upon atm. conditions, *e. g.*, in clear weather 0.35 mg. per 100 cu. ft., on a foggy day 2.44 mg.

C. A. COLE.

Effects of Smoke on Vegetation. A. G. RUSTON. *Chem. Trade J.*, 49, 522.—The effect of smoke is to shut off the sunlight from the plant which in Leeds amounts to 17%, and by choking up the pores and covering the leaves with a sticky, black varnish to prevent the action of what sunlight remains. 80% of the leaves of the conifers grown in Leeds have their stomata choked with tar. The acids from industrial chimneys limit the growth of soil organisms, principally the nitrifying ones.

C. A. COLE.

Air Pollution in Scotland. P. FYFE. *Chem. Trade J.*, 49, 523.—In various towns in Scotland 83 boxes were placed 30–35 ft. above the ground for 2 mos. At the end of this period the contents were weighed and analyzed. Results show a great variation in comp. as affected by the industrial activity of the towns, prevailing winds, and rainfalls.

C. A. COLE.

U. S., 1,009,739, Nov. 28. A. A. GUEST and W. P. GIBBONS, Lower Gornal, England. **Machine for discharging and charging gas retorts.**

U. S., 1,009,960, Nov. 28. E. H. ELLIS, Somerville, Mass. **Making waterproof fuel briquets** by mixing with comminuted fuel a comp. containing an insol. carbonized reaction product of H_2SO_4, molasses and H_2O, pressing into briquets, and then subjecting the briquets to heat to render them hard and waterproof.

U. S., 1,009,961, Nov. 28. *Idem.* **Making waterproof fuel briquets** as in preceding patent, except that starch is used instead of molasses.

U. S., 1,010,242, Nov. 28. A. B. DUFF, Pittsburgh, Pa. **Gas producer.**

U. S., 1,011,043, Dec. 5. W. FELD, Linz, Ger. **Making ammonium sulfate and sulfur from gas** by treating it with SO_2 in the presence of as much S as is necessary to convert the NH_3 combined with the SO_2 into thiosulfate, then converting the latter into polythionates by further treatment with SO_2 and decomposing the polythionates by heat into $(NH_4)_2SO_4$ and free S.

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22. PETROLEUM, ASPHALT, COAL TAR AND WOOD PRODUCTS.

R. E. HUMPHREYS.

The Effect of Added Fatty and other Oils upon the Carbonization of Mineral Lubricating Oils. C. E. WATERS. *J. Ind. Eng. Chem.*, 3, 812–6.—Fats, in general, diminish % of "varnish" and insolubility in petroleum ether. Asphalt, paraffin, linseed oil,

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increase the insolubility. S causes no marked difference. Fe_2O_3 very greatly increases both "varnish" and insolubility, a fact of significance in the study of cylinder deposits. R. E. HUMPHREYS.

The Roumanian Petroleum Industry and the Technics of Drilling R. TITUS. *Chem. Tech. Ztg.*, 29, 137–8. O. E. BRANSKY.

The Importance of the North African Petroleum in the Petroleum War. H. NEUBERGER. *Petrole*; through *Chem. Tech. Ztg.*, 29, 139–40.—The deposits of Egypt, Tunis, Algier, lying but 50 to 100 kms. from the Mediterranean give promise of considerable oil. O. E. BRANSKY.

Paraffin Fractionating Distillation. ANON. *Mon. du pétrole roum;* through *Chem. Tech. Ztg.*, 29, 140–1.—The Fischer distillation method yields a white, pure wax free from heavy oils, and sepd. into various sorts according to their properties, without the use of cooling, distillation and wash app., filter presses, and H_2SO_4, which are necessary in the ordinary method of the manuf. of paraffin wax. The residues containing the wax are conveyed into cast-iron distillating app. of special form, so arranged that the oil vapors easily ascend, and are carried over into condensers by circulating superheated steam. In this operation the vacuum prevailing in the condensers and distilling app. aids greatly. The paraffin and oil vapors pass through perforated plates into the condensers, which are kept at such a temp. that the paraffin vapors condense, while the oil vapors are carried into a second condenser where they are condensed completely. The paraffin flows from one cooling plate to a second, and so on, and is sepd. into different grades. A similar sepn. is also obtained in the case of the heavy oils. O. E. BRANSKY.

Analysis of Mixtures of Ceresin and Paraffin. N. CHERCHEFFSKY. *Mat. grasses*, 4, 2235–9; *Siefensieder Ztg.*, 38, 986–7.—Since ceresin, made by chem. treatment from Galician ozocerite, costs about 6 times as much as distilled paraffin, methods of sepn. were worked out, to be applied to the unsapon. residue obtained in the ordinary way in fat analysis. It was assumed that the m. p. of com. ceresin is fairly const., about 69°, and that the most likely adulterant is paraffin m. about 52°. (1) Solubility was tested in 10 organic solvents, and the greatest differences were found in the case of CS_2 (p., 19.07 g.; c., 1.97 g., per 100 cc. at 15°) and CCl_4 (p., 11.78; c., 1.95). (2) Critical soln. temp.; this is said to be almost independent of the proportion of solvent and substance used; it is the temp. at which a mixt., heated in a sealed tube until the meniscus of sepn. becomes horizontal, shaken and allowed to cool, becomes turbid. EtOH, 96.5%, is recommended as solvent; in this case ceresin becomes turbid at 172.5° and paraffin at 148°. Various known mixts. of ceresin and paraffin gave results within 0.6° of calc. temps. (3) Temp. of turbidity; method of detn. same as last, except that the tube is open. In case of C_6H_6, which is recommended as solvent for this test, the temp. is 47.4° for pure ceresin, and 24.7° for paraffin. (4) n of pure ceresin at 78° is 1.4352, at 100°, 1.4268; for paraffin, 1.4280 and 1.4185 resp. In all cases, the values obtained with mixts. are approx. arithmetically proportionate to the values of the pure constituents. (Also in *Ann. chim. anal.*, 16, 456–62.) C. R. BRAGDON.

Tar and Tar Products. A. D. WHITTAKER. *Progressive Age*, 29, 916–8. C. A. COLE.

Sulfate Manufacture. 18. Pine Oil from Manufacture of Soda Cellulose (HILDING). 23.

U. S., 1,010,209, Nov. 28. K. L. V. ZIMMER, Hamburg, Ger. **Forming road surfaces by treating stony particles with a soln. or emulsion of a binder, such as tar**

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or asphalt, to form a coating, pptg. the binder, *e. g.*, by treatment with dil. HCl, to form a coherent deposit, and then distributing and rolling.

23. CELLULOSE AND PAPER.

A. D. LITTLE.

The Acetylation of Cotton Cellulose. C. G. SCHWALBE. Darmstadt. *Z. angew. Chem.*, 24, 1256–60.—In a former paper (*C. A.*, 4, 1603) evidence was presented to show that cellulose acetate is formed by the acetylation of hydrocellulose formed by hydrolysis of the cellulose. Since the ability of cellulose to hydrolyze has been demonstrated sufficiently it needs only to be proved that this hydrolysis is not a side reaction brought about by H_2SO_4. In the acetylation there are 3 possible reactions: (1) Cellulose is hydrolyzed to hydrocellulose and this is acetylated; (2) acetylation and hydrolysis take place simultaneously; (3) hydrolysis follows after complete acetylation. Hydrocellulose is present in the reaction mixt. as soon as it is made up. The quantity present does not increase with standing; therefore, reactions (2) and (3) are excluded. E. J. WITZEMANN.

Titration of White Liquor in the Manufacture of Sulfate Cellulose. B. LINDQUIST. *Papier-Fabrikant*, 9, 1126–8.—The quantity of active alkali in the waste liquor may be readily detd. by the pptn. of the Na_2CO_3 with $BaCl_2$ and titrating with standard HCl with phenolph. indicator while stirring. The test is quick and accurate to 0.5%. V. NUNEZ.

The Alleged Acid Content of Acetylcellulose Solution. H. FREDERKING. *Mitt. kgl. Materialprüfungsamt*, 29, 360.—Many acetates of cellulose retain small quantities of the H_2SO_4 used in their manuf., but "cellit" contains no free acid and owes its faint acidity to a small content of weakly acid salt-like compds. V. NUNEZ.

Pine Oil Obtained in the Manufacture of Soda Cellulose. HILDING. Bergström. *Papier-Fabrikant*, 9, *Fest. Auslandscheft*, 76–82.—Scotch pine wood cooked according to the sulfate process forms a "soap" which on treatment with HCl yields an oil containing 46.9% resin and 53.1% fatty acids, palmitic, oleic, linoleic, and a mixt. of colophonic acids. The soap also contains a phytosterol having a *l*-rotation and a m. p. of 133.5°. V. NUNEZ.

Influence of Wood Cellulose on the Strength of Parchment Papers. C. BARTSCH. *Papier-Fabrikant*, 9, *Fest. Auslandsheft*, 23–24; *J. Soc. Chem. Ind.*, 30, 887.—Comparison of the parchment papers containing 10–45% wood cellulose with those made from pure cotton gave the following av. results, resp.: Breaking length, 4655, 4300 m., stretch, 10.8, 6.1% and no. of folds, 989, 1232. No definit influence on the strength can be deduced from these figures. V. NUNEZ.

The Preservation of White Mechanical Wood Pulp. B. HAAS. *Papier-Fabrikant*, 9, 1219–22.—It has been proposed to preserve piled white mechanical pulp from dry-rot and mold by covering it with a layer of brown wood-pulp. In H.'s opinion, this does not offer adequate protection. V. NUNEZ.

Bleaching of Wood Pulp. Further Notes on Color Analysis. R. W. SINDALL AND W. BACON. *World's Paper Trade Rev.*, 56, 817. V. N.

Microscopic Details of Certain Wood Pulps. I. Distinction between Sulfite and Soda Pulps. J. F. BRIGGS. *World's Paper Trade Rev.*, 56, 529–30.—Pine woods do not work up well by the sulfite process while spruce woods yield a good pulp. Pine is used almost exclusively, however, in the soda process. A simple microscopic dif-

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ferentiation between fibers of sulfite and soda pulps is to est. the number of pine and spruce fibers and consider the one as soda pulp and the other as sulfite. The test necessarily has many limitations. (II). **Distinction between American and European Poplar Pulps.** *Ibid.*, 673–4.—In distinction to European poplar pulps, the American poplar pulp is not made from true poplar but from the wood of the tulip tree. Pulps made from these woods contain broad, thin-walled casts with large, open mouths at both ends. In the case of the European poplar pulp, these mouths are open and unobstructed, but in the case of the American poplar pulp, 3 or 4 fine filaments are found stretched across the open ends. V. NUNEZ.

Sources of Error in the Colorimetric and Microscopic Determination of Mechanical Wood Pulp. ANON. *Papier-Fabrikant*, 9, *Fest. Auslandsheft*, 100–5.—Colorimetric detn. of mechanical wood pulp is open to a number of errors and is inferior to microscopic exam. When $ZnCl_2$–I soln. is used as a fiber stain, it is advizable to color the fibers previously with 0.5% soln. of malachite green containing a few drops of AcOH. Ground wood is then colored green, chem. pulp blue, and rag fibers red. The color of liquefied fibers remain without alteration several hrs. V. NUNEZ.

Adansonia digitata. "Baobab" Tree Bark as a Paper-making Material. J. S. REMINGTON, *et al.* *Paper Mill*, 43, 17. V. N.

Microscopy of Certain Paper-making Pulps. T. F. HANAUSEK. *Papier-Fabrikant*, 9, *Fest. Auslandsheft*, 38–43; cf. *C. A.*, 5, 3908.—A microscopic study of the following tropical paper-making materials: Albizzia, Himalayan spruce, bamboo, bagasse, and rice-straw. V. NUNEZ.

Is the Tobacco Plant Suitable for Paper-making? C. BAUDISCH. *Wochbl. Papierfabr.*, 42, 3817–20. V. N.

Kraft Paper. ANON. *Papier-Fabrikant*, 9, 1213–7.—A brief discussion of the working of kraft pulp in the beating engins and on the machine. V. N.

Black Needle Paper. ANON. *Papier-Fabrikant*, 9, 1105–6.—Three formulas are given. V. N.

Esparto Half-stuff. ANON. *World's Paper Trade Rev.*, 56, 974.—According to an Algerian process, raw esparto is exposed to the action of a ferment in the presence of sea-water. This ferment is an ext. from the gastric juices of herbivorous animals; it attacks the pectic principles of the esparto. The esparto is then put into a vat with NaOH soln. of 3–7° Bé. and a low voltage elec. current passed through. The NaCl absorbed by the plant from the sea-water is broken down by the current into NaOH and Cl, both of which attack the non-cellulose of the plant. The half-stuff so obtained is pressed, washed in the beater, and bleached by the hypochlorite made from sea-water. V. NUNEZ.

Bagasse in Cuba. H. WREDE. *Papier-Fabrikant*, 9, 1029–34.—In the new McMullen process for the extraction of sugar, the cane is shredded by special machinery, the pith and fiber sepd. by screening, and baled. The cane is then exported and the sugar extd. in the U. S., the residual fiber being used as a paper-making material. V. NUNEZ.

Straw Pulp Manufacture in Russia. E. ALTMANN. *Chem. Ztg.*, 35, 979.—Description of a factory which makes straw pulp by a soda process. V. N.

Alizarin Board. ANON. *Papier-Fabrikant*, 9, 1158–9.—Three formulas are given V. N.

The Removal of Dust in Mills. W. WINKELMANN. *Papier-Fabrikant*, 9, 1189–92, 1210–2. V. N.

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Experiences when Working without the Top Couch-roll. ANON. *Papier-Fabrikant*, 9, 1070–1. V. N.

U. S., 1,009,790, Nov. 28. J. A. ROSS, Boston, Mass. **Wall paper** formed of paper stock having granules of sawdust incorporated therein so that the paper has a rough or pebbly surface.

U. S., 1,010,038, Nov. 28. W. FRITZSCHE, Crefeld-Bockum, Ger. **In treating paper in the preparation of imitation stained glass,** first coating tissue paper on 1 side with thick varnish, then embossing it, coating the opposit side of the paper, and finally filling in the embossings and smoothing them over.

24. EXPLOSIVES.

C. E. MUNROE.

Historical Studies. G. W. MACDONALD. *Z. ges. Schiess-Sprengstoffw.*, 6, 374–6; cf. *C. A.*, 3, 1459; 4, 2373. C. G. STORM.

Reports on Explosives. DAUTRICHE. *J. Soc. Chem. Ind.*, 30, 309; cf. *C. A.*, 5, 1839–41. C. G. S.

Variations in the "Limit Charge" of Explosives with Testing Galleries of Different Cross Section. VICTOR WATTEYNE AND J. BOLLE. *Ann. mines belg.*, 16, 289–320; through *Z. ges. Schiess-Sprengstoffw.*, 6, 321, 344, 371.—The chief factors influencing the limit charge of an explosive which can be fired into explosive mixts. of natural gas or coal dust with air, are variations in (1) comp. of explosive, (2) physical condition of explosive, (3) nature of wrapper, (4) comp. of gas or dust mixt., (5) conditions of temp. moisture, etc., (6) d. of loading, (7) diam. of gallery. Expts. were made with 3 galleries of resp., 2.0, 0.95, and 0.28 sq. m. section, the gas mixts. containing $7^3/_4$–$8^3/_4$% CH_4, the coal dust with 21–22% volatils, ground to 1280 mesh per sq. cm. Bore of cannons 55 mm. (rejected at 62 mm.). Temp. of tests 20–30°. 5 types of explosives representing the "permitted" explosives of Belgium, were tested in gas and in dust in each of the galleries. In general, the limit charge in both gas and dust decreases as the diam. of the gallery decreases. The most remarkable reductions were in the case of the carbonite type in coal dust, the limit charge in the smallest gallery being 94% less than in the largest, and in the chlorate type, in gas, a similar reduction of 94%. C. G. STORM.

"The Lower Limit of Inflammation of Mixtures of the Paraffin Hydrocarbons with Air." MAURICE J. BURGESS AND RICHARD V. WHEELER. *Proc. Chem. Soc.*, 27, 262.—The conditions under which self-propagation of flame can take place in mixts. of inflammable gases and air were discussed. The authors find that the smallest quantity of pure methane that will enable self-propagation of flame to take place when a source of heat is introduced into a mixt. of it with air is 5.6% by vol. of the mixt. That is to say, the "lower-limit mixt." contains 5.6% of methane. For the paraffin hydrocarbons the lower limit of inflammation varies inversely as the calorific value of the gas. Thus, if L = the proportion of the paraffin hydrocarbon necessary to form a lower-limit mixt., and C = its calorific value, $L = kl/c$, where k is a const. Using methane (= 5.60) as the standard to obtain the value of k, the observed and calc. values of L resp., for the following gases are: Ethane, 3.10, 3.15; propane, 2.17, 2.19; *n*-butane, 1.65, 1.68; *n*-pentane, 1.37, 1.36; *iso*-pentane, 1.32, 1.36. CHARLES E. MUNROE.

"Fire Shells" with Flat Trajectory for Producing Fires and Explosions on Armored

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Ships. VICTOR TILSCHKERT. *Z. ges. Schiess-Sprengstoffw.*, 6, 403–5.—The experience of the Russian-Japanese war showed that fires may be caused on ships from the hot inflammable gases liberated on the bursting of explosive shells. The Japanese shells, loaded with "Shimose", were much more effective in this respect than the Russia shells loaded with guncotton, the temp. of explosion of the former being said to be more than $1^1/_2$ times as great as that of the latter. T. proposes that much more disastrous results could be obtained by the use of Goldschmidt's thermite as a shell filler. Thermite, a mixt. of powdered Al and Fe_2O_3, when ignited by a suitable priming charge, will give a reaction yielding a mass of molten material with a temp. of 3000°, 1 kg. evolving 4500 cal. The shell itself would be melted and its contents scattered about with sufficient heat remaining to melt through the deck plates and start fires in the interior of the ship. A charge of 22 kg. in a $30^1/_2$ cm. shell would evolve 99,000 cal., sufficient to melt 450 kg. Fe. The use of thermite as a constituent of explosives is not a new idea, but its application as a shell filler is claimed as original

C. G. STORM.

Blasting Supplies. F. H. GUNSOLUS. *Mines and Minerals*, 31, 222.—G. discusses the importance of proper app. for firing explosive charges, and correct methods of using same, including elec. detonators, caps, fuse, squibs, etc. Elec. firing is considered the most effectual and economical system. The proper method of priming the charge and connecting wires is described in detail C. G. STORM.

Report on the Explosion of an Acetylene Generator Supplying Oxy-acetylene Welding Apparatus. *Eng. News*, 66, 271–2.—C_2H_2 when compressed to approx. 2 atms. acquire properties which it loses again when the pressure is withdrawn. C_2H_2 under atm. pressure, without an admixt. of air or O, will not ignite or explode, even with the elec. spark. When subjected to a high temp. the mols. in contact with the hot surface polymerize into other substances and if the temp. is high enough, breaks down into H and C. This change is local, and may go on indefinitly, so that C_2H_2 in the presence of a hot surface is not dangerous until by compression to approx. 2 atms., when the mol. are brought sufficiently close together so that the dissociation of one is transmitted to the other. When this point is reached all the C_2H_2 under pressure will dissociate with explosive violence. The cause of the disaster was the rise of pressure above the point of dissociation in the interior of the generator, accompanied by a rise of temp. in the carbide, owing to the water of condensation, or to some drops of water falling upon the carbide in such a manner as to raise the temp. locally above the point of dissociation of the C_2H_2. The accident was due to the failure of the safety valve to relieve the excessive pressure. E. J. ERICSON.

An Unexplained Blast Furnace Explosion. H. DRESLER. *Stahl u. Eisen*, 31, 270–2.—The accidental entrance of air into the gas conduit was followed by an explosion of the mixt. The cause of the ignition is not known. C. G. STORM.

Coal Dust Experiments. ANON. *Engineering*, 91, 826–7.—A review of the experimental methods used in coal dust explosion investigations conducted by the U. S. Bur. of Mines, and also at the Lievin and Rossitz testing stations. Wet zones were found to be effective only when at least 197 ft. in extent. Expts. on the use of stone dust or cement for preventing the propagation of explosions are described.

C. G. STORM.

Coal Dust. II. X. *Rev. gén. chim.*, 14, 146–50; cf. *C. A.*, 5, 2331.—X. discusses the formation of dust, means of preventing initial ignition and of reducing the probability of the propagation of an explosion. Remarks on the work of the expt. testing stations at Lievin, Frameries, Altofts, Gelsenkirchen and Rossitz.

C. G. STORM.

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The Chemistry of Coal Dust Explosions. ANON. *Mines and Minerals*, 31, 264–6. —Results of expts. in steel-testing gallery at Lievin, France. Gas samples were taken in the gallery at the time of explosion, immediately behind the breast of flame, with a vacuum flask, opened by the explosion of a detonator as the dust explosion reached that point. Tests with varying amts. of dust show in general that the ratio of CO to (CO_2 + CO) is low, the gases being collected before the red-hot C had time to reduce the CO_2 to CO. Where collection was slower (10–5 m. behind the flame), the ratio was 50–60%, showing that such reduction actually occurs. This illustrates the dangers of after-damp from dust explosions, the O having been almost entirely consumed. The H burned in each expt. was calc. from the O lost in forming H_2O. It is probable that in the regions behind the flame, reactions such as $H_2 + CO_2 = H_2O + CO$ occur. Analysis of the dust left after explosion showed less volatils and higher ash than the original dust. Even when calc. ash-free there was still a reduction in volatil matter, showing a distillation of the H and hydrocarbons from the part of the dust which was not completely burned. The solid residues consisted of apparently unchanged dust, finely divided or granulated coke, and soot. C. G. STORM.

The Cooling of Powder Magazines on Ships. A. TYTOW. *Z. ges. Schiess-Sprengstoffw.*, 6, 382–4.—The explosions on the French ships, Jena, Couronne and Liberté have emphasized the dangers of storage of powder on ships. The Jena Commission specially recommended the use of cooling app. for keeping the temp. of magazines below 25°, as well as the complete isolation of black powder from nitrocellulose powder magazines. The slight damage done to the Japanese ships at Zuzima is attributed to inferior ballistics of the Russian powder, caused by decomp. during the long voyage in hot climates. Only by artificial cooling can the stability of nitrocellulose powder under such conditions be assured. Illustrations are given of several types of app. used on ships of various navies. Two systems are used: (1) The magazines are provided with cooling coils through which circulates a soln. cooled in a sep. reservoir; (2) they are supplied with air driven by a blower through a circulation system of coils containing either a liquefied gas, (CO_2, NH_3, or CH_3Cl), or a brine of $CaCl_2$ or NaCl. (1) is not considered satisfactory, and of the 2 types of the second system the use of a brine gives the greater efficiency. The brine is generally cooled by liquid CO_2 although the CH_3Cl machine has given promising results. C. G. STORM.

The Analysis of Mercury Fulminate Cap Compositions. UTESCHER. Spandau. *Z. ges. Schiess-Sprengstoffw.*, 6, 402–3.—In the case of a mixt. of Hg fulminate, $KClO_3$, Sb_2S_3, and powdered glass, 1 g. of the comp. is treated with 100 cc. H_2O, 5 cc. H_2SO_4 (1 : 5) added and the Sb and Hg pptd. as sulfides. The filtrate is evapd. in a porcelain dish, transferred to a weighed Pt dish when the Cl has entirely escaped, dried, ignited and weighed as K_2SO_4; calc. as $KClO_3$. The sulfide ppt. is dissolved by heating with 5 cc. conc. HCl, 2 cc. 50% tartaric acid soln., and 1 cc. HNO_3. The powdered glass is dried and weighed. Hg is pptd. by electrolysis with a current of 3 volts and $1^1/_2$ amp. on Pt cathode, the electrolyte then made alk. with NaOH, 25 cc. Na_2S soln. (10%) added and Sb pptd. with a current of 3 volts and 1 amp. at 80–90°; 2 hrs. required for each electrolysis. An alternate method is given, the Sb_2S_3 being dissolved in NH_4HS, evapd., oxidized with HNO_3 and weighed as Sb_2O_3; the Hg weighed as HgS. C. G. STORM.

Regulations for Factories Manufacturing Ammonium Nitrate Safety Explosives. *Z. ges. Schiess-Sprengstoffw.*, 6, 412–4.—Regulations issued by the Prussian Minister of Commerce and Interior, Aug. 4, 1911. C. G. STORM.

The Action of Atmospheric Moisture on the Moisture Content and Rate of Combustion of Black Powder. KARL KULLGREN. Stockholm. *Z. ges. Schiess-Spreng-*

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stoffw., 6, 364–7, 385–6.—The powder investigated was unglazed, 3200 grains per g. and contained 74.0% KNO_3, 15.1% C, 9.8% S, 1.1% H_2O. Samples of 2, 4, or 8 g. were exposed to a current of air at 16.5° containing either 38% or 86% relative humidity, until const. wt. was obtained. The av. moisture content in the former case was reduced to 0.91%, in the latter case increased to 1.39%. Thus, the original 1.1% moisture would correspond to a relative humidity of about 50%. The moisture condition of the powder when equil. was reached was practically the same in all cases where the relative humidity was the same, regardless of wt. of sample, thickness of powder layer or original moisture in sample. K. attempts to work out a mathematical expression for the rate of change in H_2O content. The effect of varying moisture on the rate of burning of fuse was shown by tests of schrapnel time fuse containing the same powder with 0.84, 1.10, and 1.34% moisture. The rates of burning for a given length were, resp., 13.06, 13.26, and 13.38 sec. This variation of $^1/_2$ sec. would result in a difference of 100 m. in the explosion point of a shell with a velocity of 400 m. p. s. C. G. STORM.

The Inflammability of Mixtures of Methyl Chloride and Air. SAPOSHNIKOV. *Z. ges. Schiess-Sprengstoffw.*, 6, 384.—The use of CH_3Cl in refrigerating machines gives special interest to the investigation of this subject. Two vols. of CH_3Cl burn completely in 3 vols. O or 15 vols. air, as follows: $2CH_3Cl + 3O_2 = 2CO_2 + 2H_2O + 2HCl$. Its heat of combustion is only 3099 cal. per kg., as against 13000 cal. per kg. for CH_4. 100 cc. of 12% CH_3Cl and 88% air failed to ignite although an elec. spark was passed through 5 min. The following results were obtained on larger portions of the same mixt. (10 l. for each test): (1) With elec. spark or match, explosion; (2) with flame from wood or alc., slow burning without explosion; (3) with flame from tuft of pyroxylin, slow oxidation without flame; (4) with red-hot Pt wire, no ignition; (5) with white-hot Pt wire, explosion. Limits of combustibility are between 10% and 15% (by vol.). Flame is extinguished in 20% CH_3Cl. C. G. STORM.

Metal Mine Ventilation. ANON. *Mines and Minerals*, 31, 337–40.—A report of the S. African Mining Regulations Commission. A full discussion of the necessity for ventilation, methods for ventilating, the effects of CO_2, CO and NO_2, and general recommendations. The latter include: Max. amt. of total CO_2 allowable, 20 vols. in 10,000; max. CO allowable, 0.01%; NO_2 not to be present in determinable amts. C. G. STORM.

The Work of the Association for the Prevention of Accidents in 1910. *Z. ges. Schiess-Sprengstoffw.*, 6, 416–8.—A report of numerous explosions and accidents in Germany in various explosives works. Of special interest is a discussion of the effects of nitrous gases. C. G. STORM.

Responsibilities of Contractors in Making Shipments of Explosives. B. W. DUNN. *Eng. News*, 64, 661.—D. calls attention to Govt. and Interstate Commerce Comm. regulations for shipping explosives and emphasizes the dangers of exudation of nitroglycerin from dynamite, careless packing, shipping, etc. C. G. STORM.

25. DYES AND TEXTIL CHEMISTRY.

L. A. OLNEY.

The Natural Dyes and Coloring Matters of the Philippines. B. T. BROOKS. Bur. of Sci., Manila. *Phillip. J. Sci.*, 5, 439–52.—Largely a review together with some new experimental work. E. J. WITZEMANN.

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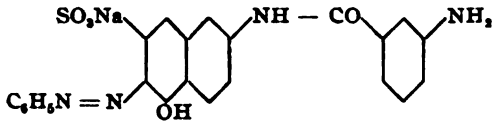
Advances in Red Developing Dyes with Special Reference to Rosanthrenes. J. SCHMID. Basel. *Chem. Ztg.*, 34, 1099.—A new class of diazotization dyes discovered by the Ges. Chem. Ind. in Basel is described. They are used principally for producing red dyes fast to washing, on wool, under such names as rosanthrene-red Bordeaux-rose, orange, etc. Unlike the previously known dyes of this sort which on diazotizing in the fiber and developing with β-naphthol, *m*-toluylenediamine, etc., give dark colored developing shades of the trisazo and polyazo type, the rosanthrenes give red, scarlet and orange developer shades. This effect depends on an exonuclear amido group which is present in the aryl residue which is combined with substantive azo dyes of 2,5,7-amidonaphthosulfonic acid by a carbamide group. The simplest example would be



which is obtained by treating the acid with diazobenzene. The shade and quality may be varied in 3 ways: (1) By selecting different diazo compds., tetraazo compds. and so-called intermediate compds. for combination with the above acid; (2) by substituting the aryl residue containing the amido group with Me, alkyloxy, halogen, nitro, etc.; (3) by the position of the amido group to the CO in the aryl residue; *m*-amido group compds. give brighter developer shades than the *o*- and *p*-compds. In the competitive products zambesi-red and diazobrilliant scarlet the carbamide group is replaced by an imidazol and thioazole group, resp. Recent results have been obtained by introducing aminophenylpyrazolonecarboxylic acid derivs. and methylphenylpyrazolone. In the absence of a competing S red dye these dyes are of importance for the production of cheap turkey-red dyeings. E. J. WITZEMANN.

Microscopic Investigation of Wool and Artificial Wool. G. INGERMAN. *Pharm. Weekblad*, 48, 1101–11.—A good illustrated paper. P. FERMAN. *Ibid.*, 1258–64. V. E. HENDERSON.

U. S., 1,009,740, Nov. 28. O. GÜNTHER, Elberfeld, Ger. Assignor to Farb. vorm. F. Bayer & Co., same place. **Azo dyes** obtainable from 2-amino-8-naphthol-6-sulfonic acid, sulfo acids of diaminodiphenylureas and β-naphtholaminosulfonic acids, their Na salts being dark powders sol. in H_2O, yielding on reduction with $SnCl_2$ and HCl *p-p'*-diaminodiphenylurea-*m-m'*-disulfonic acid which is further split up into CO_2 and *p*-phenylenediaminesulfonic acid and a diaminonaphthalenesulfonic acid compd., and dyeing cotton from red to violet-red shades fast to light.

U. S., 1,009,741, Nov. 28. *Idem.* **Azo dyes** obtainable from 2-amino-8-naphthol-6-sulfonic acid, sulfo acids of diaminodiphenylureas and 2-amino-5-naphthol-7-sulfonic acid, their Na salts being dark powders, sol. in H_2O, yielding on reduction with $SnCl_2$ and HCl *p-p'*-diaminodiphenylurea-*m-m'*-disulfonic acid which is further split into CO_2 and *p*-phenylenediaminesulfonic acid, a 1,2-diamino-8-naphtholsulfonic acid compd. and a 2,6-diamino-5-naphthol-7-sulfonic acid compd. and dyeing cotton from red to violet-red shades.

U. S., 1,009,745, Nov. 28. C. HEIDENREICH, Leverkusen, near Cologne, Ger. Assignor to Farb. vorm. F. Bayer & Co., Elberfeld, Ger. **Dye** of the formula

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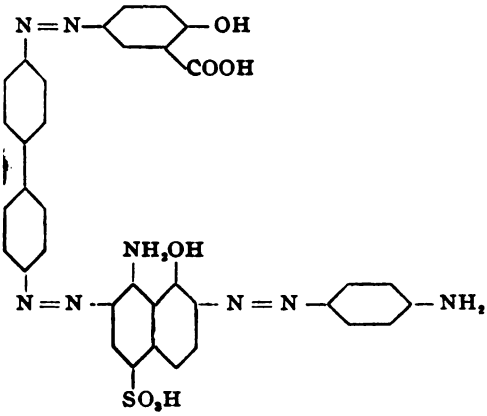
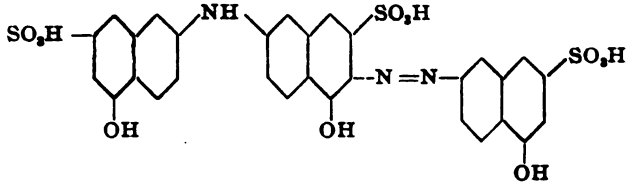


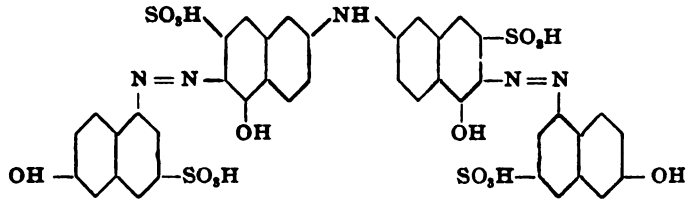
a dark powder, sol. in H_2O with a green color and in conc. H_2SO_4 with a violet-black color, dyeing cotton green shades which on being developed with β-naphthol turn to darker green; yielding on reduction with $SnCl_2$ and HCl benzidine, *p*-aminosalicylic acid, 1,2,7-triamino-8-naphthol-4-sulfonic acid and *p*-phenylenediamine.

U. S., 1,009,796, Nov. 28. H. SCHWEITZER, Elberfeld and A. ZART, Vohwinkel, near Elberfeld, Ger. Assignors to Farb. vorm. F. Bayer & Co., Elberfeld, Ger. Dye, probably having the formula



its Na salt being a dark powder sol. in conc. H_2SO_4 with a violet color, yielding on reduction with $SnCl_2$ and HCl 2,5,7-aminonaphtholsulfonic acid and 6-amino-5-5′-dioxy-2,2′-dinaphthylamine-7-7′-disulfonic acid, and dyeing cotton reddish violet which when developed with diazotized *p*-nitroaniline is bluish violet fast to washing and which can be discharged to a pure white.

U. S., 1,009,797, Nov. 28. *Idem.* Disazo dye, probably having the formula



its Na salt being a dark powder sol. in conc. H_2SO_4 with a reddish blue color, yielding on reduction with HCl and $SnCl_2$ 1,6,3-aminonaphtholsulfonic acid and 6-6′-diamino-5,5′-dioxy-2,2′-dinaphthylamine-7,7′-disulfonic acid, dyeing cotton violet which when developed with diazotized *p*-nitroaniline is a pure violet fast to washing and leaving a pure white when discharged.

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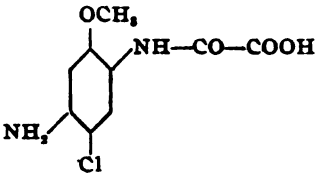
U. S., 1,009,952, Nov. 28. W. BERGDOLT, Leverkusen, near Cologne, Ger. Assignor to Farb. vorm. F. Bayer & Co., Elberfeld, Ger. **Tetraazo dyes obtainable from *p*-diamines, diamines and phenols, the products being brown powders yielding on reduction with HCl and $SnCl_2$ a diaminodiaryl compd., a triamine and an aminophenol, dyeing yellowish brown shades fast to washing which can be well discharged by treating cotton dyed with these dyes with diazotized *p*-nitroaniline.**

U. S., 1,009,981, Nov. 28. R. LESSER, Berlin, Ger. Assignor to Farbwerke vorm. M. L. & B., Höchst a/M, Ger. **Dyeing in a vat with benzoquinone derivatives in which 2 H atoms have been replaced by aromatic amine radicles and other H atoms have been replaced by non-aromatic substances, *e. g.*, quinonedianilide, by reducing the dye in alk. soln. to leuco compds., coloring the fiber with these leuco compds. and and developing the color in the usual manner.**

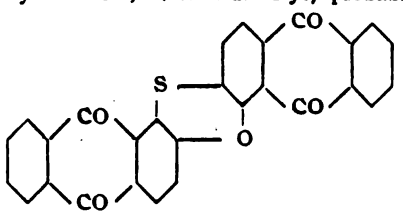
U. S., 1,010,274, Nov. 28. J. LEISEL, Charlotte, N. C. **Dyeing apparatus.**

U. S., 1,010,433, Dec. 5. H. JORDAN and W. NEELMEIER, Leverkusen, Ger. Assignors to Farbn. vorm. F. Bayer & Co., Elberfeld. **Trisazo dye obtained from a compd. of the formula**



2 mol. proportions of 1-naphthylamine-6-sulfonic acid and 1-naphthol-3-sulfonic acid, a dark powder sol. in H_2O with a blue color, yielding on reduction with $SnCl_2$ and HCl 2,5-diamino-4-chloro-1-anisol, 1,4-naphthylenediamine-6-sulfonic acid and 1-naphthol-2-amino-3-sulfonic acid, dyeing cotton blue which when diazotized on the fiber and developed with *β*-naphthol changes to greenish blue discharged to a pure white by hydrosulfite.

U. S., 1,010,463, Dec. 5. P. THOMASCHEWSKI, Vohwinkel, Ger. Assignor to Farb. vorm. F. Bayer & Co., Elberfeld. **Dye, probably having the formula**



recrystallizing in red-brown needles from b. quinoline, sol. in b. $C_{10}H_8$ with an orange color, sol. in conc. H_2SO_4 with a green color, and dyeing cotton from a hydrosulfite vat yellow-red shades.

U. S., 1,010,513, Dec. 5. F. M. MORTON, Phoenix, Ala. **Dyeing apparatus.**

U. S., 1,010,637, Dec. 5. O. KIRCHEIS, Philadelphia, Pa. **Dyeing apparatus.**

U. S., 1,010,919, Dec. 5. P. JULIUS and E. FUSSENEGGER, Ludwigshafen a/Rh, Ger. Assingors to Badische Anilin & Soda Fabrik, same place. **Producing dyes of the pyrazolone group by combining dihydroxytartaric acid with 2 mol. proportions of the hydrazine of 3-bromo-2-amino-1-methylbenzene-5-sulfonic acid, the product being a yellow powder sol. in water to a greenish yellow soln., dyeing wool yellow and forming yellow lakes fast to light.**

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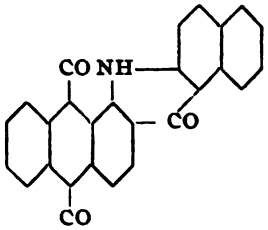
U. S., 1,010,930, Dec. 5. A. LÜTTRINGHAUS, Ludwigshafen a/Rh, Ger. Assignor to Badische Anilin & Soda Fabrik. **Dye of the anthracene series** obtained from haloanthraquinone-2-carboxylic acid and 3,4-dichloroaniline; a dichloroanthraquinoneacridone containing both Cl atoms in the benzene ring, in the *p* and *m* positions to the NH group, a red powder sol. in hot aniline with a crimson color and insol. in 70% H_2SO_4 and dyeing cotton red shades from a vat.

U. S., 1,011,068, Dec. 5. *Idem.* **Dye** obtainable from 1-haloanthraquinone-2-carboxylic acid and β-naphthylamine and having the formula



a red powder, difficultly sol. in b. aniline with a brownish red color, yielding a reddish yellow soln. in 70% H_2SO_4 from which soln. after a short time an orange ppt. seps., insol. in 65% H_2SO_4 and dyeing cotton from a vat red shades.

U. S., 1,011,084, Dec. 5. H. SCHMID, Mülhausen, Ger. Assignor to Badische Anilin & Soda Fabrik. **Producing brown to violet to black shades** with discharge effects on the fiber by applying to the material a mixt. containing *p*-phenylenediamine, a chlorate and a ferrocyanide, at least half the *p*-phenylenediamine being in the free state, drying the material, printing it with a paste containing a reducing agent and subjecting it to the action of steam.

U. S., 1,011,085, Dec. 5. *Idem.* **Producing brown shades on fiber** by applying a mixt. containing *p*-phenylenediamine, an aminophenol, a chlorate and a V compd., at least half the amino groups being in a free state, drying the material and subjecting it to the action of steam.

26. PIGMENTS, RESINS, VARNISHES AND INDIA RUBBER.

A. H. SABIN, D. SPENCE.

Preparation of Ink-forming Substances. A. FIECHTER. *Chem. Ztg.*, 35, 1066; cf. *C. A.*, 5, 2001.—Several technical applications for the products are suggested.
ANDREW MAYER, JR.

Researches on Rosin. C. G. SCHWALBE AND E. KÜDERLING. *Wochbl. Papierfabr.*, 42, 4197–8.—Investigation of rosins from a number of sources show that the detn. of the "acid no." is of very little use on the valuation of a rosin. V. NUNEZ.

Linoleum and its Modern Manufacture. M. DE KEGHEL. *Rev. chim. ind.*, 22, 297.—Valuable and complete descriptive article, not suitable for abstract.
A. H. SABIN.

Recent Scientific Advances and Problems in the Chemistry and Industry of India Rubber. ERNST STERN. *Fortschritte Chem.*, 4, 329–40.—Review. J. J.

Contributions to the Chemistry of India Rubber. II. Physicochemical Investigation of the Resin Extraction Process. D. SPENCE AND J. H. SCOTT. *Z. Chem. Ind. Kolloide*, 9, 83.—Starting from the conception that rubber, in common with other

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typical colloids, manifests characteristics indicative of surface conc. the authors have applied their method of extraction (*C. A.*, **5**, 3629) to the investigation of the condition of the resins in raw India rubber. Not only is the extraction of the resins from India rubber an exceedingly slow process but where a fixed quantity of solvent is used in extraction an equil. between the soln. of the resins in b. acetone, the rubber and the resin is quickly attained. On extracting samples of raw rubber with b. acetone for stated intervals in an app. constructed for this purpose, this equil. was obtained in $^1/_2$ hour and the curve of extraction of the acetone-sol. material from raw rubber is that of a typical absorption similar to the extraction curve of salts from gelatin. From figures of Zilchert (*C. A.*, **5**, 2002) the authors have plotted the extraction curves for a number of different rubbers and point out that not only do these curves all follow the course of a typical absorption isotherm but also they indicate differences in adsorptive capacity of the different rubbers which may be due to differences in the degree of dispersity of the rubber phase. These differences may be of value as a means of evaluating the physical qualities of raw rubber. A distinction is made between "essential" and "accidental" resinous constituents of raw rubber.

D. SPENCE.

Caoutchouc, Artificial and Natural. V. CAYLA. *J. agr. trop.*, 1911, 198.—A general account of the present position and future outlook of synthetic rubber. The high cost of production of all synthetic rubbers to date prohibits use industrially. Synthetic rubber will come eventually but not to replace natural India rubber on the world's markets. Its influence will, however, be felt. The position of synthetic rubber cannot be compared with that of synthetic indigo for no systematic effort was made to develop the natural indigo; its position may be more accurately compared with that of the synthetic camphor. The ever increasing production of rubber substitutes (factice) is another factor which will have a depressing effect on the price paid for rubber in the future. The policy of increasing and improving the cultivated rubber by scientific methods is advocated. D. SPENCE.

Synthetic Rubber. HEINRICH LOEWEN. *Kunststoffe*, 1, 44, 65.—A résumé of modern scientific work on synthetic rubber. An account of methods and patents for the prep. of hydrocarbons of the 1,3-butadiene series and of the polymerization of these to rubber-like substances. D. SPENCE.

U. S., 1,009,752, Nov. 28. J. HUEBNER, Chicago, Ill. In **making tires**, forming a filler with convolutions of flexible material coated with a layer of rubber and $(NH_4)_2CO_3$, placing an outer rubber casing on the filler, and heating the structure thus formed to convert the rubber coating into sponge rubber and vulcanize the parts together.

U. S., 1,010,050, Nov. 28. F. HOFMANN and L. TANK, Elberfeld, Ger. Assignors to Farb. vorm. F. Bayer & Co., Elberfeld. **Producing isoprene** by heating to above 500° methylcyclohexanol with Fe filings or Al sesquioxide.

U. S., 1,010,356, Nov. 28. W. ECKFORD, Rhyl, England. **Making red lead** by subjecting granulated or powdered Pb, Pb oxide or massicot or dry or floury PbO to heating on the bed of a mechanical coloring oven, either under atm. pressure or under slight suction, grinding the resulting partly colored red lead dry under slight vacuum, again coloring it on an oven bed and grinding, the operations being repeated without exposure to the open air as often as may be required to obtain the desired red shade.

Can., 135,738, Sept. 26, 1911. G. V. BARTON, Liverpool, Eng. Manuf. of white lead by adding $(CH_3CO_2)Pb_2Aq$ to a mixt. of sublimed, non-fused PbO and H_2O and carbonating under pressure.

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27. FATS, FATTY OILS AND SOAPS.

E. SCHERUBEL.

Iodine Value of Fatty Oils. E. J. PARRY. *Chem. Druggist*, 79, 387.—Absorption of I by non-drying oils is not completed in 2 hrs. For such oils at least 6 hrs., and for fish oils 12–18 hrs. should be allowed for drying. A. VORISEK.

Estimation of Water in Soap. R. M. FITZPATRICK. *Chem. News*, 104, 247.—Into a 200 cc. conical flask 1 g. of sample is weighed and warmed until soap is dissolved. The soln., after cooling, is filtered into a 200 cc. flask like above and residue washed with 20 cc. abs. alc. Paper and residue are dried and weighed. The filtrate is allowed to cool and 5 g. of anhyd. Na_2SO_4 added. The flask is stoppered and allowed to stand 12 hrs. The soln. is then filtered into a weighed conical 200 cc. flask. The Na_2SO_4 in flask and on filter is washed with warm abs. alc. The alc. is evapd. on H_2O bath and the soap dried 15 min. in steam oven, then cooled and weighed. This wt. + wt. of alc.-insol. residue subtracted from wt. of soap taken gives wt. of H_2O. A necessary point to observe is that the soln. before adding Na_2SO_4 does not deposit any soap jelly. E. SCHERUBEL.

The Chemistry and Practice of Soap-making. W. H. SIMMONS. *Perf. Ess. Oil Record*, 2, 224–6.—A summary of a course of lectures, 1911–2. A. VORISEK.

Euphorbia cerifera, Alcocer. GABRIEL ALCOCER AND J. MCCONNELL SANDERS. Mexico. *Anales. inst. med. nacional*, 11, 155–62.—The yield of purified wax is 2.5–5% of the dry wt. of the plant, varying according to age. The physical and chem. consts. of the wax vary according to the age of the plant and the period of the year when collected. Following are the limits of variation: D_{15}^{15}, 0.9820–0.9856; n^{85}, 1.4545–1.4626; acidity (mg. KOH), 12.73–18.11; sapon. no., 35.0–86.5; R-M no., 0.53–7.69; I no., 14.42–20.40; non-sapon. material, 76.7–77.27%; hydrocarbons, 42.49–59.70%; H evolved by decomp. of alc. (at 0° and 760 mm.), 35.35 cc. Hydrocarbons were isolated by treating the wax with potash lime, extracting the residue with abs. alc. and C_6H_6, evapg. the filtered soln., recrystg. several times, and treating with Ac_2O and anhydrous AcONa in order to decompose all trace of higher alc. After crystg. several times from C_6H_6 and Et_2O there was obtained a white substance, m. p. 67–68°. Ultimate analysis and detn. of mol. wt. by the ebullioscopic method indicated a formula between $C_{31}H_{64}$ and $C_{35}H_{72}$; the substance is probably a mixt. of higher paraffin hydrocarbons. The wax dissolves readily in $CHCl_3$, warm Et_2O, C_6H_6, and turpentine. Plants grown on the coast contain less wax and more caoutchouc latex than those grown in the interior; the difference is probably due to the higher temp. and moisture of the coast region. This wax is recommended as suitable for use commercially in making shoe blacking, lacquers, insulating materials (using the wax alone or mixed with caoutchouc or gutta-percha) for elec. app. molds, floor wax, etc. A botanical description of the plant is given. H. S. PAINE.

U. S., 1,010,017, Nov. 28. J. C. CHISHOLM, Dallas, Tex. **Refining crude cottonseed oil** by heating it with a compd. such as Na aluminate until the fatty acids present are neutralized, then heating it with an alkali hydroxide and sepg. the oil from the ppt. formed (cf. *C. A.*, 6, 165).

28. SUGAR, STARCH AND GUMS.

A. HUGH BRYAN.

Direct Determination of Sucrose in all Products Containing More or Less Reduc-

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ing Sugars. **Destruction of Reducing Sugars.** H. PELLET AND P. LEMELAND. *Intern. Sugar J.*, 13, 616.—The method is applicable even to sirups and molasses containing considerable quantities of reducing sugars: (1) Make a soln. of the molasses that will contain at most 5% of reducing sugars. (2) Measure 50 cc. of this soln. into a 300 cc. flask, add 7.5 cc. of NaOH (36° Bé.), then 75 cc. H_2O_2 (12 vols.), and 60 cc. water. (3) Mix and place the flask in b. water bath for 20 min. (4) Cool, neutralize the remaining alkalinity fairly exactly with AcOH, and clarify with 15–40 cc. basic lead acetate soln. (36° Bé.), according to the amt. of material taken, the reducing sugars destroyed, and the impurities initially contained in the liquid. (5) Complete the vol. to 300 cc., mix well, and filter. Polarize directly in the 200 or 400 mm. tube. To 50 cc. of the filtrate add 1 cc. of glacial AcOH, make to 55 cc., and after mixing, polarize again, account being taken of the diln. This is done because the second polarization is often a little different from the first, in which the liquid is alkaline. If a difference is observed the second reading is used. The % sucrose is calc. on the soln. and from that on the sample. Where no reducing sugars are present there may be a slight destruction of sucrose, but with the presence of reducing sugars no destruction of sucrose can be detected. Raffinose is not affected, so this method can be used for its detn. by inversion. A. GIVEN.

The Determination of the Sulfurous Acid in Glucose. OSWALD CLAASSEN. *Chem. Ztg.*, 35, 1065–6.—The addition of $CaCO_3$ to the H_3PO_4 soln. of glucose in the usual distillation method for the detn. of SO_2 is unnecessary, as samples, run both with and without carbonate, give results that agree within experimental limits. It is a needless complication to distil in a current of CO_2, and apparently AcOH may be used as well as H_3PO_4. H. S. BAILEY.

Report of the Jamaica Sugar Experiment Station for 1908, 1909 and 1910. *Intern. Sugar J.*, 13, 600.—This report covers manurial expts., expts. with varieties of cane and experimental distillery work in improving the quality and yield of rums.

A. GIVEN.

The Raffinose Content and the Non-sugar Ratio of Raw Beet Sugars. F. STROHMER. *Deut. Zuckerind.*, 36, 341–2.—The ratio of organic to inorganic non-sugar, *o/A*, was formerly considered an indication of the quality of raw sugar. Gawalowsky asserted that in first products the ratio, 1.5 organic non-sugar to 1 ash held constantly. Although this was shown to be incorrect by S., the recent Berlin Raffinose Conference of chemists of the English refining industry assumed that exceptions to the rule were due to raffinose. S. shows 5 series of expts. on samples from Austria-Hungary containing but small quantities of raffinose and no relation is found to exist between raffinose and the ratio *o/A* although the values of the ratio obtained varied between 1.02 and 1.86. Expts. were conducted on 300 samples of raw sugar which neither wholly nor partially came from a desaccharification of molasses. Although these were found to be free from raffinose the non-sugar quotient lay under 1.5 in many cases. In samples from the desaccharification of molasses raffinose in quantities from 0.4–2.65% was found. In these cases the statement of the English chemists was applicable. It was found that the higher the raffinose content, the lower the non-sugar quotient. In agreement with F. Sachs the author considers it useless to test all sugars for raffinose whose non-sugar quotient is below 1.5, but such tests should be limited to the products of desaccharification of molasses. R. F. JACKSON.

The Requirements of the Beet Sugar Factory as Compared with the Cane Sugar Establishment. II. ED. KOPPESCHAAR. *Intern. Sugar J.*, 13, 593.—A discussion of the diffusion battery, the handling and uses of the pulp, and the liming of beet juices. A. GIVEN.

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Beet Pulp. CH. D. G. *Sucrerie belge*, 40, 106.—The siloing of the leaves and tops of the beets with the pulp is recommended; and also the use of lactic acid ferments which it is said will develop in the silo, drive out or prevent the development of other bacteria, and make the silage more valuable in many ways. A. GIVEN.

Determination of Sugar (TAKAHASHI). 11b. Determination of Sugars (NEUBERG, ISHIDA). 11b. Bagasse in Cuba (WREDE). 23.

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30. PATENTS.

Abstracts of patents are included under the foregoing divisions of the Journal. The abstracts of U. S. patents are prepared by Earl T. Ragan, those of the British, French and German patents by O. D. Swett and those of Canadian patents by Russell S. Smart, of Fetherstonhaugh & Co., Ottawa (5 Elgin St.). The abstracts of French patents are prepared, with permission, on the basis of the abstracts in *Chemiker-Zeitung*, those of German patents from *Chemiker-Zeitung* and *Chemisches Zentralblatt.*

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CHEMICAL ABSTRACTS

Vol. 6. FEBRUARY 20, 1912. No. 4

1. APPARATUS.

L. C. JONES.

A Height-adjustable Burner. PHILIP BLACKMAN. *Chem. News*, 104, 259.—Elongated burner to be supported in a clamp. H. V. MAIN.

Apparatus for Making Hydrogen Sulfide. J. R. HUBER. *Met. Chem. Eng.*, 9, 649.—HCl 1-2, trickles over stick FeS in an 18-in. tower. The displaced air in the bottle receiving the waste acid goes into the top of the tower. H. V. MAIN.

An Improved Gas-washing Flask. H. BORCK. *Chem. Ztg.*, 35, 1232.—The app. described in *C. A.*, 4, 3023 is improved by replacing the holes near the bottom of the inner cylinder with inverted V-shaped notches. J. H. MOORE.

A New Extraction Apparatus. F. FRIEDRICHS. *Z. anal. Chem.*, 50, 756.—Designed for extracting large vols. of soln. with Et_2O. It consists of a flask connected through a wide tube with the upper part of the vertical, cylindrical vessel containing the soln., and by means of a narrow return tube with this vessel near the middle. The lower part of this container and the return cooler on top are of the spiral design described by F., *C. A.*, 5, 1693. A long-stem funnel delivers the condensed Et_2O at the bottom of the spiral when it rizes through the soln. and returns to the boiling flask through the return tube. J. H. MOORE.

Two New Extracting Apparatus for Liquids. E. C. TEN BOORNKAAT KOOLMAN. Inst. Garungsgewebe, Berlin. *Biochem. Z.*, 34, 481-4.—Two forms of app. for the extraction of liquids with ether. In one the liquid is kept stirring by means of an air current. In the other, specially designed for extracting small quantities, the ether bubbles are made to rize through a long spiral tube which contains the liquid to be extracted. G. M. MEYER.

A Simple Apparatus for Steaming out and Sterilizing Flasks. K. FEIST. *Apoth. Ztg.*, 26, 497.—A simple generator consisting of a flask provided with a funnel passing through the stopper; the stem of the funnel reaches below the level of the water in the flask. A glass tube passes through the stem of the funnel and, by means of a bend, its lower end reaches above the level of the water and therefore serves as an outlet for the steam. A. SEIDELL.

A Centrifugal Clarifier and Filter. ANON. *Eng. News*, 66, 730.—Illus. description of DeLaval Separator Co. machine consisting of centrifugal disk clarifier and forced multiple centrifugal filter. H. V. MAIN.

Centrifugals for Laboratory Work. ANON. *Met. Chem. Eng.*, 9, 675-6.—Description of $4^1/_2$ inch hand or power geared centrifugals sold by Victor J. Boulin, 123 Liberty St., N. Y. H. V. MAIN.

Recording Voltmeter, Ammeter and Pyrometer of Accuracy and Great Sensitiveness. ANON. *Eng. News*, 66, 682-3. (Illus.)—Bristol replaces stylus and smoked chart with Au capillary and paper, preserving tapping mechanism. H. V. MAIN.

The Universal Metalloscope. A Perfected Microscope for the Examination of Metals. A. SAUVEUR. Harvard Univ. *Bull. Am. Inst. Mining Eng.*, 60, 961-71. (Illus.)—The microscope tube is mounted on a bar supported at each end by 2

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substantial cast-iron legs. This construction allows specimens of considerable size to be placed below the objective. For supporting magnetic specimens an electromagnetic stage is provided. This is made by cutting a V-shaped opening in a steel plate 7 × 14 in. and placing a solenoid on each arm. The stage is supported by 3 adjustable legs, 1 at each corner of the V. The 2 arms of the V extend some distance beyond the ends of the solenoids. A large specimen, such as a rail section, will be drawn by the magnetic force against the under side of the V leaving the part exposed between the arms open to observation. For small specimens a V-shaped template is provided which is held by the stage and in turn holds the specimen. Non-magnetic specimens are held by rubber bands to the stage or template. A portable mechanical stage is provided which can be used in place of the electromagnetic stage if desired.
CARLE R. HAYWARD.

Apparatus for Metallography. CARLE R. HAYWARD. Mass. Inst. Technology. *Bull. Am. Inst. Mining Eng.*, 60, 973–9. (Illust.)—An elec. furnace, a horizontal grinding and polishing machine and a device for mounting specimens are described. The furnace has a vertical porcelain tube wound with an inexpensive resistance tape. The tube is easily replaced when the tape burns out. The grinding and polishing machine has a shaft, rotating in a horizontal plane, to which may be attached emery wheels or cloth-covered Al disks. The latter are moistened with water, carrying abrasives, siphoned from bottles above the machine. The entire surface of the disk is available for polishing. The mounting device is to provide a quick method for attaching the specimen to a glass slide so that its surface will be perfectly level.
C. R. H.

A Universal Goniometer. A. HUTCHINSON. *Min. Mag.*, 16, 100–9.—This is a goniometer of the suspended type, intended primarily for the exam. of small crystals. All the usual crystallographic and optical detns. can be performed as the instrument can be used for any of the following purposes: (1) As an ordinary goniometer for the measurement of angles; (2) as an axial angle app.; (3) as a Kohlrausch total-reflectometer; (4) for detg. refractive indices by the prism method. W. F. HUNT.

Note on Laboratory Grinders. J. W. MELLOR. *Trans. English Ceram. Soc.*, 10, 121–3. (3 Figs.)—Automatic power-grinders of McKenna and Carling for powdering clay and rock samples for analysis. H. K. C.

Precision Fermentation Saccharometer (SÖHLE). 11B. Metallographic Experiments (BAUMÉ, WATSON). 9.

U. S., 1,012,391, Dec. 19. A. L. MARSH. **Holder for metallurgical laboratory utensils.**

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2. GENERAL AND PHYSICAL CHEMISTRY.

JOHN JOHNSTON.

The Kaiser Wilhelm Institut für physikalische Chemie und Elektrochemie in Dahlem near Berlin. WILLIAM D. HARKINS. *J. Ind. Eng. Chem.*, 3, 938–9. J. J. M.

Development of the Atomic Theory. VII. The Rival Claims of William Higgins and John Dalton. A. N. MELDRUM. *Mem. Manchester Lit. Phil. Soc.*, 55, 1–11.—Historical. J. J.

Spanish Nomenclature in the Chemistry of Carbon. P. EDUARDO VITORIA. *Anales soc. espan. fis. quim.*, 9, 308–14. H. S. PAINE.

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Dr. Johnstone Stoney's Logarithmic Law of Atomic Weights. LORD RAYLEIGH. *Proc. Roy. Soc. London*, (*A*) **85**, 471–4.—Extracts from a paper submitted by Stoney to the Roy. Soc. in 1888, which was not published in full. The logarithmic spiral diagram was published in *Phil. Mag.* in 1902. J. JOHNSTON.

Structural Theory of the Chemical Elements. J. W. NICHOLSON. *Phil. Mag.*, **22**, 864–89.—An outline of a structural theory in which the elements are treated (in a sense) as compds. of a primary form of matter. The theory indicates that the number of electrons in an atom is roughly proportional to the at. wt., the ratio generally being near 2.5. ROBT. F. EARHART.

The Fluid Crystals of O. Lehmann. C. MAUGUIN. Paris. *Physik. Z.*, **12**, 1011–5.—A lecture, summarizing M.'s results. J. J.

Crystallin and Amorphous Liquids. O. LEHMANN. *Physik. Z.*, **12**, 1032–5; *Ber. physik. Ges.*, 1911, 945–51.—A lecture. J. J.

Mutual Conversion of Crystalloids into Colloids. ROHLAND. *Naturw. Wochschr.*, 1911, 426; through *Schweiz. Wochschr.*, **49**, 617.—A résumé of the known facts on this subject. S. WALDBÖTT.

The Flame Arizing from the Nitrogen-burning Arc. R. J. STRUTT. Imp. Coll. Sci., So. Kensington. *Proc. Roy. Soc. London*, (*A*) **85**, 533–6.—The greenish yellow flame from the high-tension a. c. arc is in complete continuity with the "after-glow" phenomenon in vacuum tubes containing air. The latter can be proved to be due to the further oxidation of oxides of N by O_3. Accordingly it is concluded that the flame arizing from the arc is due to the same cause. The arc produces O_3 and oxides of N, which unite in the region above and around it, developing the greenish yellow flame observed. J. JOHNSTON.

The Specific Heat, C_p, of Air at Room Temperature and at Low Temperatures. KARL SCHEEL AND WILHELM HEUSE. Reichsanstalt, Charlottenburg. *Ber. physik. Ges.*, 1911, 870–4; *Physik. Z.*, **12**, 1074–6; *Ann. Physik*, **37**, 79–95.—The sp. ht. of air at const. pressure was measured at 20°, —78° and —183° by the continuous flow method. The air, previously freed from H_2O and CO_2, was drawn by aspirators through what is in effect a long glass tube in either end of which was placed a resistance thermometer with which to measure the temps. of the incoming and outgoing air. A measured amt. of heat was supplied electrically to the air at the middle of the tube, which was sealed in an evacuated silvered tube. The whole was immersed in a suitable const. temp. bath. The values given of C_p in watt-seconds per g. per deg. are as follows: 20°, 1.009; —78°, 1.019; —183°, 1.058. The sp. ht. at 20° agrees well with that found by Swann, 1.010 watt-secs. per g. per deg. (*C. A.*, **4**, 1919).
L. H. ADAMS.

Three Forms of the Equation of State and the Internal Heat of Vaporization. T. THORKELSSON. *Physik. Z.*, **12**, 633–7.—T. discusses 3 forms of the van der Waals equation, and derives an expression giving the internal heat of vaporization as a function of the temp., the d. of the liquid and satg. vapor, and the const. a in the van der Waals equation. J. HUNT WILSON.

The Foundation of the Mechanical Theory of Heat. F. HASENÖHRL. Vienna. *Ber. physik. Ges.*, 1911, 756–65; *Physik. Z.*, **12**, 931–5.—After a brief introduction in which the influence of the Planck theory of energy-units on the mechanical theory of heat is emphasized the author points out that by making certain assumptions about the relation between the energy and period of vibration of a vibrating body and using the Planck theory, Balmer's formula for the wave lengths of the spectrum lines due to an element can be derived. GRINNELL JONES.

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A General Law Concerning the Behavior of Solid Bodies at very Low Temperatures. W. NERNST. Berlin. *Physik. Z.*, 12, 976–9.—"Recent investigations of sp. heats, in agreement with the requirements of the theory of energy-units, made it certain that for every solid body there is a certain range of temp. from abs. zero upwards in which the conception of temp. practically loses its significance. Within this range every property which is detd. by the mean behavior of the atom must be independent of the temp." This rule may be said to be firmly established in the cases of the following properities: Vol., sp. heat, thermal coeff. of expansion, compressibility and the free energy and total energy changes of a reaction. Nernst also expresses the opinion (but with some reserve because strong proof is yet lacking) that thermal cond. of metals is finite and independent of temp. for a certain range above the abs. zero and that thermoelectromotive force and the Peltier effect approach zero as the temp. approaches abs. zero. Cf. *C. A.*, 6, 175. GRINNELL JONES.

Flow of Heat through Bodies. CARL HERING. *Met. Chem. Eng.*, 9, 652–4.—A compilation of physical consts. made up largely of the thermal resistivities of various materials met with in the construction and maintenance of elec. furnace walls. C. A. COLE.

Heat Transmission. H. P. GURNEY. *J. Ind. Eng. Chem.*, 3, 455–62.—The article contains a series of tables and formulas concerning the conductance and resistance of various substances to heat transfer; boundary resistance, such as metal and liquid, metal and air, etc.; heat transfer by counter-current, parallel current, perpendicular current and single current app.; and heat transmission in steam-jacketed and vacuum steam-jacketed kettles. R. H. JESSE, JR.

Heat Radiation. H. P. GURNEY. *J. Ind. Eng. Chem.*, 3, 807–12.—The Stefan-Boltzmann radiation law is discussed and formulas are presented for the cases where there is heat transfer from both conduction and radiation. Some examples of the application of these formulas are: The calc. of the temp. difference between the fire and the water sides of boiler plates; the investigation of the efficiency of insulating spaces and materials; the heat-transmitting capacity of the heating surface of the combustion chamber of boiler; etc. R. H. JESSE, JR.

Thermodynamics of Compressibility and Expansion. I. PHILIP BLACKMAN. *J. Physic. Chem.*, 15, 874–6. J. J.

"Osmotic Temperatures" and the Kinetic Signification of the Thermodynamic Potential. PH. KOHNSTAMM. *Proc. Akad. Wetenschappen* (English), 13, 778–88.—To reach a state of equil. in which an equal number of particles move inwards and outwards we must raise either the pressure of the soln., whereby more solvent mols. are forced out, or its temp., so that the number of outgoing mols. will be increased by the greater velocity. The increase of temp. which must be given to the soln. to bring about this condition is called the "osmotic temp." It is shown that the number of mols. passing the membrane in unit time cannot be found upon the supposition that the thermodynamic potential of the substance is the same in the solution and in the solvent, for here we have no state of equil. since there exists a temp. difference and so a current of heat. From thermodynamic treatment it is shown that $N = Ce^{\{\mu - f(T)\}/RT}$ and that the exponent must be the thermodynamic potential, at least as regards its dependence on v and x; but thermodynamics cannot give a complete solution. The kinetic theory, however, can show that we must have an equation of this form for N and it can det. $f(T)$; but it can show only with a rough approximation that the functions of v and conc. occurring in this expression are the same which occur in the thermodynamic potential. The two methods combined give $N = \sqrt{T}e^{\mu'/RT}$ where μ' is the thermodynamic potential freed from the functions which

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are dependent only on T. From this the differential equation of the osmotic temp. is derived: $dx/(1-x) = (v/(v-b) + 0.5)dT/T$. It is shown however that the detn. of the exptl. value of the osmotic temp. will not give an independent value for the quantity b in the liquid state. R. H. JESSE, JR.

Thermodynamic Potential and Velocities of Reactions. PH. KOHNSTAMM AND F. E. C. SCHEFFER. *Proc. Akad. Wetenschappen* (English), 13, 789–804.—In the preceding abst. the formula for N represents the number of particles passing the membrane when a stationary state has been reached, where an equal number of particles enter and leave a soln. in unit time. In this paper the question is raised, how many more particles will leave the soln. than enter it when there is no equil. of exchange between soln. and solvent through a membrane, or, how great will be the velocity in a certain state with which the whole system tends to reach equil. The equation derived for the velocity of reaction, $-dc/dt = C(e^{(\mu_1 + F_1)/RT} - e^{(\mu_2 + F_2)/RT})$, ($\mu_1$ and μ_2 are the sum of the mol. thermodynamic potentials for the disappearing and forming system; F_1 and F_2 are functions of the temp., and further of consts. which refer to the reacting substances or perhaps to intermediate states in the reaction) reduces to well known expressions of the mass law both for rarefied gases and for dil. solns. A mathematical discussion which cannot be presented in abstract establishes that F in the above equation is too loosely defined. F must contain values of energy and entropy which reduce the values of these in the exponent to differences of energy and entropy. With regard to the former, one difference of energy must det. one velocity of reaction, the other the other, their algebraic sum being the heat of reaction. There is some discussion of the "intermediate state," which determins this splitting up of the heat of reaction. The authors consider that though the nature of the intermediate states can only be a matter of supposition it is established that for every reaction such states have a real signification as far as the velocity is concerned, and they are led to what they hold is a more general and lucid classification of the conception of catalysis and allied phenomena, which includes the following cases: (1) A reaction which does not take place, or only proceeds slowly, between pure substances is started or accelerated by a subst. which is present in small quantity, but does not itself take part in the reaction. The equil. is independent of the nature of the catalytic agent. (2) A subst. which added in small quantity changes both the velocity and equil. (3) By the addition of a subst. which takes no part in the reaction the specific energy of the reacting substs. is changed either from a difference which appears in the mutual attraction or from association of the solvent with one of the reacting substs. (4) The cases under (3) may belong in another category in which is no real equil. where the modified state must be accompanied by a "current of energy." Such a system would no longer respond to the laws of thermodynamics, just as it was shown that for the "osmotic temp." the thermodynamic law of constancy of thermodynamic potential is not fulfilled. R. H. JESSE, JR.

The Vapor Pressure Function. I. W. CEDERBERG. *Z. physik. Chem.* 77, 707–18; cf. *C. A.*, 5, 3748.—By introducing into the vapor pressure equation of van der Waals, $\log \pi_0/p = a(\vartheta_0/T - 1)$, a logarithmic function the author obtains the expression $A' \log^2 p + B' \log p + C' = \vartheta_0/T - 1$. A', B' and C' being constants which may be evaluated from direct measurements. If the equation holds up to the critical point $C' = -(A' \log^2 \pi_0 + B' \log \pi_0)$. Solving the above equation $\log p = (A'' - B'' \vartheta_0/T)^{1/2} - C''$, where $A'' = B'^2/4A'^2 - (C' + 1)/A'$, $B'' = -1/A'$ and $C'' = B'/2A'$. The values of p calc. from this equation are compared with similar numbers given by the equation of Nernst, $\log p = A + BT + C \log T + D/T$, over a wide range of temps., using the following substances: Water, benzene, fluorobenzene, bromobenzene, iodobenzene, toluene, Et formate and Et_2O. On the whole better

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agreement is shown between the observed values of p and those calc. from the first equation, particularly at temps. above 100°. J. HUNT WILSON.

Electric Birefringence of Gases. R. LEISER. *Physik. Z.*, 12, 955–6.—L. has measured the electric birefringence of gases by the same method used by him on organic liquids. (*Abhandlungen Bunsen Ges.*, No. 4). The vapors of those org. compds. which previous work on liquids had indicated would have a relatively high birefringence were first investigated; later other gases were found to have a measurable birefringence. The measurements show that the Kerr const. is proportional to the pressure. N, O, NO and CO_2 gave no certain birefringence at a pressure of 2 atm. The Kerr const. for EtCl, MeCl, MeBr, MeCHO, NH_3, CO_2 and HCN at various pressures is given. Some of these substances were also investigated in dil. solns.; the Kerr const. was found proportional to the conc. though the abs. value depends on the solvent.

J. L. CRENSHAW.

The Weight of a Falling Drop and the Laws of Tate. X. The Drop Weights of some Further Associated and Non-associated Liquids, and the Surface Tensions and Capillary Constants Calculated from them. J. L. R. MORGAN AND F. T. OWEN. Columbia Univ. *J. Am. Chem. Soc.*, 33, 1713–27.—On the basis of the definition of normal mol. wt. previously given, it is shown that Me hexyl ketone, benzyl cyanide, benzaldehyde, piperidine, diisoamyl, isoamyl acetate and nitrobenzene are non-associated liquids; while Me Et ketone, Et_2O, Me_2CO, PrOH, PrCN are associated. The values of the surface tension and capillary const. calc. resp. from drop wt. and drop vol. are in close agreement with the mean values of these quantities derived from other modes of measurement. J. JOHNSTON.

The Change of Ultimate Strength with Temperature. FR. HAUSER. Erlangen. *Ber. physik. Ges.*, 1911, 906–20.—Expts. were performed on the resistance to rupture of beams of various materials with the object in view of throwing light on the well known observation that the strength of iron increases with temp. to a certain point and then decreases. The strength of hard rubber as a beam is practically independent of the temp. from 0–25°; above that temp. it decreases. That of wax decreases with rizing temp., while in the case of rosin it increases with temp. up to about 30° and then decreases. A small trace of wax added to the rosin alters the character of its temp.-strength curve. Of especial interest is the fact that this curve bears a strong resemblance to that of Fe. L. H. ADAMS.

Isopiestic Expansibility of Water at High Pressures and Temperatures. W. WATSON. Leipzig. *Proc. Roy. Soc. Edinburgh*, 31, 456–77; see also *Ber. Sächsischen Ges. Wiss. Leipzig* (*math-phys. Klasse*), 63, 264–8 (1911).—For description of the app. used see des Coudres, *C. A.*, 5, 2449, to which the following is to be added. The bomb consists essentially of a steel cylinder 60 cm. long, 18 cm. diam., with a central bore 6 cm. wide. It is closed at each end by plugs which are of the bayonet-joint type. Through these plugs pass the lead-wires for elec. furnace and for thermo-couples, and the tubes of the cooling spiral. The furnace is a Pt tube 10 cm. long, 15 mm. diam., with walls 0.15 mm. thick; currents up to 1000 amp. were used, and temps. of over 1200° thereby attained. Thermal insulation is secured by means of 3 or 4 concentric cylinders of Ni, the distance between each pair being 2 mm. This construction impedes the circulation of the H_2O with which the bomb is filled, so that the H_2O serves as the heat insulator. Further cooling is obtained by means of a helical coil of brass tubing, which fits inside the bomb but outside the Ni cylinders. (A brief description in English of the bomb of des Coudres is also given in the present article.) The expansion of the H_2O was observed by means of a quartz-glass pycnometer of special form so arranged that when the vol. of the H_2O in it reached a certain value a Hg column made a contact between 2 wires. The re-

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lation between sp. vol. and temp. was detd. at pressures of 400, 700, 1000 and 1300 atm. resp. The temps. reached in some cases was 1000°. The value of $(dv/dt)/V_0$ increases with temp. to a max. and then remains const. The value of this max. decreases with increase of pressure. While in the liquid state H_2O under high pressures and at temps. above 240° obeys the ordinary laws of the expansion of liquids, in the gaseous state (that is, at temps. above the critical) water at high pressures behaves as a substance the coeff. of expansion of which is independent of temp. and decreases with pressure. In this respect, therefore, it behaves like such gases as O, N and H at the same pressures but at lower temps. L. H. ADAMS.

New and Simple Method for Comparing Molecular Weights. PHILIP BLACKMAN. Hackney Tech. Inst., London. *J. Physic. Chem.*, **15**, 866–8.—Relative values of the mol. wt. may be calc. from measurements of the relative velocities of diffusion of substances in soln. A simple app., based on this principle, is described; it may, however, be used only with pairs of substances (1) each of which gives a colored soln. or (2) which ppt. when brought together. J. JOHNSTON.

New Method of Determining Vapor Densities. IX. P. BLACKMAN. *J. Physic. Chem.*, **15**, 869–70; cf. *C. A.*, **4**, 1253.—A modification of the app. previously described (*C. A.*, **2**, 2029, 3297; **3**, 505). J. J.

Simple Method for Vapor Density Determinations. XI. Dehydration of Copper-Sulfate Pentahydrate. P. BLACKMAN. *J. Physic. Chem.*, **15**, 871–3; cf. *C. A.*, **3**, 1109, 2521.—The expts. recorded would seem to show that "the dehydration of [$CuSO_4 \cdot 5H_2O$] is comparable to the removal of water from an ordinary aq. soln." J. J.

Reversible Light Reaction of Sulfur. Supplementary Note. ALBERT WIGAND. Halle a/S. Physik. Inst. *Z. physik. Chem.*, **78**, 208.—Referring to his treatment of the energy relations in the reversible reaction $S_\lambda \rightleftarrows S_\mu$ in soln. and his implied equating of change of free energy by light and heat of formation of heterogeneous S_μ, W. defends this provisional usage in view of the present lack of data regarding the equil. in darkness and the effect of variation of temp. on the heat change. H. S. PAINE.

Amorphous Sulfur. VII. The Freezing Point Curves of Liquid Sulfur. A. SMITH AND C. M. CARSON. *Z. physik. Chem.*, **77**, 661–75.—The system of nomenclature adopted by the authors is as follows: S_I = rhombic or α-S, stable up to 95.6°; S_{II} = monosymmetric or β-S, stable from 96.5 to 119.25°; S_{III} = mother of pearl S (monosymmetric), labil; S_{IV} = monosymmetric, very labil; S_λ = thin liquid S; S_μ = thick liquid S. The following f. ps. have been detd. The ideal f. p. $S_\lambda \longrightarrow S_{III}$ was found by fusing the S at a low temp., 123°, with the addition of small amounts of SO_2 in order to prevent as far as possible the formation of S_μ, and cooling. The mean of a series of detns. gave 106.8°. The natural f. p. $S_\mu \rightleftarrows S_\lambda \longrightarrow S_{III}$ was detd. by adding NH_3 as catalyzer, heating to about 140° and cooling. The mean was found to be 103.4°. At this temp. there is about 3.1% of S_μ in the liquid. F. ps. ranging from 99.8° to 101.8° were observed with liquids containing larger amounts of S_μ. The ideal f. p. of the system $S_\lambda \longrightarrow S_I$ was found to be 112.8°; the natural f. p. $S_\mu \rightleftarrows S_\lambda \longrightarrow S_I$, 110.2°. Owing to the presence of both S_λ and S_μ in the liquid phase the authors show that the results of Tammann at high pressures with the system $S_I \longrightarrow S_{II} \longrightarrow$ liquid are considerably in error. Previous results with the f. p. method pointed to a mol. wt. of S_8 for S_μ dissolved in S_λ, but by adopting the value for the heat of fusion detd. by Lewis and Randall (*C. A.*, **5**, 1857) it is found that S_6 is more nearly correct. Wigand has given the ideal f. p. $S_\lambda \longrightarrow S_{II}$ as 118.95°. The authors have previously obtained 119.25.° The low value is to be attributed to the presence of small amts. of S_μ. J. HUNT WILSON.

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The Boiling Point of Water. EARL OF BERKELEY AND M. P. APPLEBY. *Proc. Roy. Soc. London*, (*A*) 85, 477–89.—This investigation deals with the relation between the b. p. of water and the conditions under which it is observed. Two similar Pt thermometers were immersed, one in a hypsometer, the other in a well jacketed vessel of water heated by passing steam through it; the differences in temp., as registered by these 2 thermometers, were detd. with an accuracy of 0.0001°. It was found that the b. p. was affected not only by the height of water through which the steam had to pass, but also by the rate at which it was passing; and this obtained although the stirring was so thorough that on moving the thermometer to different positions the max. variation was not more than 0.001°. The rise in b. p. varied from 0.027° with a height of 4 cm. of water and a rate of passage of steam such that 8 cc. H_2O condensed in 10 min., to 0.05° with a height of 7.5 cm. and a rate of 32 cc. H_2O in 10 min. The b. p. of water extrapolated down to a hypothetical value for an infinitly small layer of liquid is identical with the hypsometer point. As the variable factors are operative in any method of b., heating by a flame or by an elec. current will give no better results than the method used; in each case it is necessary to make a series of observations and extrapolate to an infinitly small layer of liquid. In the case of solns., the hypsometer point cannot be detd. directly, so that we must fall back on detns. of the temps. of the b. liquid, which are also variable. Accordingly the authors suggest the following definition of the b. p. of a soln.: Assuming that the soln. is under a standard atmospheric pressure of 760 mm., then the b. p. is the temp. of a small layer when its vapor is in equil. with the free vapor above it. J. JOHNSTON.

The Boiling Points of some Saturated Aqueous Solutions. EARL OF BERKELEY AND M. P. APPLEBY. *Proc. Roy. Soc. London* (*A*) 85, 489–505; cf. preceding abstr.—In these expts. it was found necessary to use a large quantity of finely powdered salt, and to keep the solid in rapid motion by a sufficiently powerful current of steam. If large crystals are used, or if the salt has been left in contact with the soln. too long, so that crystals have grown, the next expt. will give low values for the equil. temp., showing that the soln. is not satd. The rise due to an increase in depth of liquid will be different for different salts, both because the ds. of the satd. solns. are different, and because the solubilities differ, the effect of pressure on the b. p. being greater with the more sol. salts. The observations with a number of salts are detailed in the original: from these values were extrapolated, using 2 methods which gave results which never differ by more than 0.01°. The mean values of the b. p., under standard conditions, of satd. solns. of the salts investigated follow: NaCl, 108.668°; KCl, 108.599°; RbCl, 113.710°; CsCl, 119.919°; TlCl, 100.098°; Na_2SO_4, 102.885°; K_2SO_4, 101.392°; Rb_2SO_4; 103.511°; Cs_2SO_4, 109.964°; Tl_2SO_4, 100.317°; $NaNO_3$, 120.20°; KNO_3, 115.549°; $CsNO_3$, 107.228°; $Sr(NO_3)_2$, 106.790°; Cs alum, 100.527°. From these values, osmotic pressures have been calc. by means of the thermodynamic formula; the results show that all the salts are dissociated (excepting $TlNO_3$, for which the results are considered to be doubtful). The solubilities, and d. of the satd. soln., of each of the salts were given in a previous paper (*Phil. Trans. A*, 203, (1904)), except for $Sr(NO_3)_2$, for which the values are given in an appendix. Its solubility varies from 40.124 g. $Sr(NO_3)_2$ per 100 g. H_2O at 0.58° to 100.136 g. at 88.94°. The results, when plotted against the temp., show a transition at 29.3–29.4°; direct expt. with a dilatometer gave 29.22°. J. J.

Laws of "Concentrated" Solutions. III. The Ionization and Hydration Relations of Electrolytes in Aqueous Solution at 0°: (A) $CsNO_3$, KCl and LiCl. E. W. WASHBURN AND D. A. MACINNES. Univ. Illinois. *J. Am. Chem. Soc.*, 33, 1686–1713.—The measurements recorded include complete data on the cond., viscosity, d. and b. p. of solns. of KCl and LiCl (at concs. up to 1.0 *N*) and of $CsNO_3$ (up to 0.5 *N*). The

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conclusion is drawn that deviation from the behavior of a "normal solute" (an unhydrated non-electrolyte) cannot serve as a basis for calc. the degree of hydration of an electrolyte. Another m thod of making this calc. is outlined, from which it would appear that in 0.5 *N* soln. KCl is hydrated with about $9H_2O$, LiCl with about $18H_2O$. The cryohydric point for $CsNO_3$ is —1.254°. The measurements here recorded on the b. p. of $CsNO_3$ solns. are not in complete agreement with those of Biltz (*Z. physik. Chem.*, 40, 218 (1902)) and do not confirm his oft-quoted conclusion that $CsNO_3$ obeys the mass action law exactly. J. J.

The Effect of Salts on the Solubility of Other Salts. I. A. A. Noyes and W. C. Bray. Mass. Inst. Tech. *J. Am. Chem. Soc.*, 33, 1643–9.—A preliminary note on the effect of salts on the solubility of unibivalent salts, introductory to the series of articles which follow. These articles contain a vast amt. of accurate experimental material, of which, however, very little can be reproduced here. J. J.

The Effect of Salts on the Solubility of Other Salts. II. A. A. Noyes, C. R. Boggs, F. S. Farrell and M. A. Stewart. *J. Am. Chem. Soc.*, 33, 1650–63.—(A) **Solubility of $KClO_4$ in Presence of KCl and of K_2SO_4.** The solubility of $KClO_4$ in H_2O at 25° is 0.1481 equiv. per l. In this, as in the other papers of this series, numerous conductance measurements of solns. of single salts and of mixtures are recorded; the results were made use of as an aid in the interpretation of the observations on solubility. (B) **Solubility of $TlClO_3$ and Tl_2SO_4 in the Presence of Each Other.** The solubilities of $TlClO_3$ and Tl_2SO_4 in water at 20° are resp. 0.1340 and 0.1928 equiv. per l. (C) **Solubility of Tl_2SO_4 in the Presence of $TlNO_3$, Na_2SO_4, and H_2SO_4.** The solubility of Tl_2SO_4 in H_2O at 25° is 0.1083 equiv. per l. J. J.

III. Solubility of TlCl in Solutions of KNO_3, K_2SO_4 and Tl_2SO_4 at 25°. William C. Bray and W. J. Winninghoff. *J. Am. Chem. Soc.*, 33, 1663–72.—The solubility of TlCl in H_2O at 25° is 0.01607 mol. per l. The cond. measurements indicate that TlCl is much less ionized than nearly all other salts of this type (uni-univalent). J. J.

IV. Quantitative Discussion of the Solubility of Uni-univalent Salts in the Presence of other Salts. W. C. Bray. *J. Am. Chem. Soc.*, 33, 1673–86.—The conc. of "un-ionized" salt and the "solubility product" have been calc.; according to the mass action law, these quantities should remain const. in any soln. satd. with respect to a given salt. It was found, however, that the former decreases markedly, and the latter increases slightly, as the total concs. of salts and ions in the satd. soln. increase. This indicates "that the deviation from the theoretical dilution law is mainly due to abnormal behavior of the un-ionized substance and only secondarily to abnormal behavior of the ions." Further, the results "indicate that the ratio of the activity to the conc. of univalent ions is nearly const. below 0.016 *N*, but that above this conc. it decreases with increasing conc., at first slowly and then more rapidly. The corresponding ratio for the un-ionized portion, on the other hand, increases very rapidly with increasing conc. throughout the whole range of conc. investigated." The nearly uniform effect observed is confirmatory of the original assumption "that the ionization relations of uni-univalent salt are primarily detd. by the total equiv. ion conc." J. J.

V. The Solubility of Unibivalent Salts in Solutions of Salts of Different Types. William D. Harkins. *J. Am. Chem. Soc.*, 33, 1807–27.—In connection with this work a method for the accurate analysis of bromates was worked out, which consists in reducing the bromate to bromide by adding hydrazine hydroxide, acidifying with HNO_3, and pptg. as AgBr. The solubilities in H_2O at 25° are: Ag_2SO_4, 0.2676 mole per l.; $Ba(BrO_3)_2$, 0.04018 equiv. per l.; $PbCl_2$, 0.07776 equiv. per l. The solubilities of these 3 salts

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were also detd. in solns. of various salts. The curves representing the change in solubility belong to 3 general types, conditioned by the addition of a salt (1) with a common univalent ion, (2) with a common bivalent ion, (3) with no common ion. In the last case the solubility increases rapidly with the conc. of added salt as a result of metathesis. In the second case, the curve approaches the "theoretical" as the solubility of the dissolved unibivalent salt decreases. J. J.

VI. The Solubility of Difficultly Soluble Unibivalent Salts. W. D. HARKINS AND W. J. WINNINGHOFF, *J. Am. Chem. Soc.*, **33**, 1827–36.—The solubility in H_2O at 25° of $Ba(IO_3)_2$ is 0.001579; of $Pb(IO_3)_2$, 0.0001102 equiv. per l. Detns. were also made in solns. of other salts. With these slightly sol. salts, addition of a common bivalent ion gives a curve nearly of the theoretical form; addition of a common univalent ion causes an extremely rapid decrease of solubility; and addition of a salt with no common ion is followed by a greatly increased solubility. The curves for the addition of a common ion are of the same form as those for the addition of a salt with no common ion in the case of *very sol. salts*, like $Sr(NO_3)_2$. J. J.

VII. Discussion of the Solubility Relations of Unibivalent Salts. W. D. HARKINS. *J. Am. Chem. Soc.*, **33**, 1836–73.—A discussion of the results obtained, which cannot be abstracted briefly. The most important general conclusion follows. "The simplest hypothesis which brings the results into harmony with each other and with the behavior of uni-univalent salts is that all unibivalent salts dissociate in 2 steps, and therefore give rise to an intermediate ion of the type KSO_4^- or $BaNO_3^+$..... It is assumed that the proportion of the intermediate ion increases with the conc., and that it has in general roughly the same value for salts of the same valence type at any given conc." This hypothesis leads to a number of definit deductions, which are in complete accord with the experimental observations. J. J.

The Solubility of Electrolytes in Aqueous Solutions. I. The Solubility of Salts in the Corresponding Acids. J. I. O. MASSON. Univ. Melbourne. *J. Chem. Soc.*, **99**, 1132–9; *Proc.*, **27**, 125.—The solubilities for the systems studied (NaCl-HCl, $BaCl_2$-HCl, $AgNO_3$-HNO_3 and $Ba(NO_3)_2$-HNO_3, in aq. soln.) are given by: $a/b = k_0\{(B/b)^{k+1} - 1\}/k + 1$ in which a = g. mols. acid per l. soln. measured at 30°, b = g. mols. salt under same conditions, B = the value of b when $a = 0$, k_0 and k = consts. Engel's rule (*Compt. rend.*, **102**, 619 (1886); **104**, 433 (1887)) is shown to be the special case when $k_0 = 1$, and $k = 0$. The sp. g., s, of the solns. at 30° (if solvent H_2O has the same d. as pure H_2O), is: $1000(s - 1) = a(M_a/\delta - \alpha) + b(M_b/\delta - \beta)$, where δ is the d. of H_2O at the temp. of expt., M_a and M_b, the mol. wts. of acid and salt resp., and α and β the respective mol. vols. in cc. It was found that the coeffs. a and b are consts.; and hence the mol. vols. of the solutes are independent of their concs. The mol. soln. vol. of solvent H_2O is given by: $\gamma w + \alpha a + \beta b = 1000$, in which w is the conc. and γ the mol. vol. of H_2O. In a given series, α, β and γ, are const.; γ varies from 17.3 to 18.1 in the different systems, the order of magnitude being the reverse of that of the solubilities of the salts. Full data are given in the original.

J. C. HOSTETTER.

Theory of Normal Elements. P. J. H. VAN GINNEKEN AND H. R. KRUYT. *Z. physik. Chem.*, **77**, 744–60.—After reviewing the conditions that must be fulfilled in order that a cell may be used as a standard the authors discuss the behavior of such cells with reference to the phase relations. Considering the non-homogeneous liquid in the cell as consisting of an infinit number of homogeneous layers, the p. d. between the ends of the cell will depend on the comp. of the phases there present. Hence it is possible to regard the cell as made up of 4 principal phases, 2 at each end, the intermediate soln. serving as a non-polarizable conductor. The conclusions may be summarized as follows: (1) In order that the comp. of the 4 phases may not vary during

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the passage of the current it is necessary and sufficient that in each part of the cell the 2 phases present form an invariant (p, t) system, in which the mol. species conducting the current is found as one component. (2) That the comp. of the 4 phases may remain const. during diffusion it is necessary and sufficient that in each part of the cell the 2 phases form an invariant (p, t) system in which the diffusing substance occurs as one component. These 2 rules are applied in a discussion of the Hulett, Clark, Weston, and Daniell cells. J. HUNT WILSON.

Contribution to the Knowledge of Hypohalogen Acids and Salts. V. The Kinetics of Iodate Formation from Iodine and Hydroxyl Ions. ANTON SKRABAL. Techn. Hochschule, Vienna. *Monatsh.*, 32, 815–903.—A full account of an extensive experimental study of the formation of iodate from I and alkali and from hypoiodite and alkali. The influence of the conc. of each of the substances taking part in the reaction and of other electrolytes, and of temp. on the velocity was detd. A summary of the general results and conclusions has already been abstracted (*C. A.*, 6, 12).

GRINNELL JONES.

New Methods of Separating Liquids having Boiling Points near each other or Forming Mixtures of Constant Boiling Point. A. GOLODETZ. Polytechn., Kiev. *J. Russ. Phys. Chem. Soc.*, 43, 1041–60.—In Young's method for separating EtOH from its mixts. with H_2O (*J. Chem. Soc.*, 81, 707) by adding C_6H_6 and distilling, the latter forms with the other 2 components a ternary mixt. of const. b. p., so that only part of the alc. is obtained in pure state, the remainder distilling over with the H_2O and C_6H_6. The author uses such substances as form with one of the components only a mixt. of const. b. p. and such that this const. b. p. differs considerably from the b. p. of the other component. Thus, by adding sufficient C_6H_6 to a mixture of PhMe and AcOH (30–31% acid; const. b. p. 104°) to form a mixt. of const. b. p. (80.05°) with all of the latter (2% acid) and distilling at 80–1°, almost all of the PhMe is obtained pure. By adding sufficient H_2O to a mixture of PhMe and AcOH to form with the first a mixture (19.6% H_2O) of const. b. p. (84°) and distilling twice, almost all of the acid was obtained pure. By reversing this arrangement it is possible to obtain pure AcOH from its mixts. with H_2O by adding sufficient PhMe to form with the H_2O the mixture of const. b. p. 84° and distilling off this mixt. at this temp. From a mixt. of C_6H_6 and PhMe 94% of the latter is obtained pure in one distillation by adding enough MeOH to form a mixture of const. b. p. (58.35°) with the C_6H_6 (39.55% MeOH). MeOH is little sol. in CS_2, but dissolves about 75% of it. They form a mixture (12–13% MeOH) of const. b. p. 37.5–8°. By adding sufficient CS_2 to a mixture of MeOH and C_6H_6 and distilling at this temp. the latter is obtained pure after one distillation. Et butyrate (b. 119.9°) can be separated from amyl bromide (b. 118.5–9°) by adding PrOH which gives with the latter a mixture (70.7% PrOH) of const. b. p. 94°.

H. M. GORDIN.

Viscosity of Binary Liquid Mixtures in the Neighborhood of the Critical Solution Temperature. PAUL DRAPIER. *Bull. acad. roy. belg.*, 1911, 621–40.—The viscosity of mixts. of $PhNO_2$-hexane (24–80% $PhNO_2$) at 15–25° and of $PhNH_2$-hexamethylene (28–73% $PhNH_2$) at 28–37° was detd. While the fluidity curves of the pure substances and also of the mixts. at temps. far removed from the critical soln. temp. are practically straight lines, they deviate very greatly from the linear in the critical region; in the vicinity of critical conc. they are concave towards the temp. axis, and the fluidity isotherms near the critical temp. show a double inflection. These phenomena may possibly be explained in accordance with the views of van der Waals, that the viscosity of mixts. is characteristic of such mixts., which are to be considered as definit substances with new characteristic properties. CHAS. A. ROUILLER.

Density and Refraction of the System: Furfural + Water. F. SCHWERS. Univ.

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Pisa. *Atti accad. Lincei*, 20, II, 398–405; *Bull. acad. roy. belg.*, 1911, 641-52.—The d. of 3 solns. (4.6–6.5%) of furfural in H_2O and of 1 soln. (3.66%) of H_2O in furfural was detd. from 22–97°. The curves for the first 3 show a slight contraction for all temps., the contraction decreasing with increase in temp. At about 55°, the curves show a max., followed by a marked inflection, beyond which they tend to become parallel to the axis of abscissas. The curve for the 4th soln. is much more steeply inclined towards the axis of abscissas, which it crosses at about 45°, becoming negative, showing a regular inflection with a max. at about 70° and again becoming normal beyond that point. For any given temp. and wave length of light, the ratio C_v/C_n (where C_v and C_n are the contractions in vol. and in index of refraction, resp.) is practically const. for the different solns. but decreases as the wave lengths become shorter, owing to an increase in C_n. This difference for different wave lengths is independent of the conc. of the soln. The value of C_v/C_n seems to be independent of temp.; at least, any changes which may occur with change in temp. are not greater than the possible experimental error (cf. *C. A.*, 5, 14, 613). C. A. R.

Capillary Constants of Amalgams. G. MEYER. *Ber. physik. Ges.*, 1911, 793–5; *Physik. Z.*, 12, 975, 6.—Measurements of the change in surface tension of Hg on addition of other metals were made in an evacuated app. into the interior of which, by tipping, an amt. of Hg, or amalgam, was poured out of an elliptical opening in a continuous stream, the surface of which vibrated. The app. was filled alternately with Hg and amalgam and the time necessary for equal vols. of each to pass the opening measured. The wave lengths were detd. by means of enlarged instantaneous photographs; from these the ratios of the surface tensions of Hg and amalgam were calc. By taking the known value for Hg the abs. value for the amalgams is obtained. Amalgams of (I), Zn, Cd, Tl, Sn, Pb, Au; (II), Li, Ca, Sr, Ba; (III), Na, K, Rb, Cs were investigated. The metals in groups I and II change the surface tension of Hg, just as soln. of a salt changes that of water, some increasing and some decreasing the s. t. of the Hg in proportion to the amt. of metal added. It is to be noted that Li falls in this group and not with the alkali metals in (III). In the case of the alkali metals one can add a certain amt., which increases with the at. wt. of the added metal, without affecting the s. t. of the Hg. As soon as this amt. is exceeded there is a sudden decrease of the s. t. followed by a very gradual decrease on further addition of the metal. The s. t. of the alkali amalgams was detd. in solns. of salts of the dissolved metals as well as *in vacuo* and the same results obtained. The p. d. between streams of Hg and amalgam entering the salt solns. was also observed. Small traces of Li influence the e. m. f. but Na, K and Rb produce no effect until the conc. is reached at which a sudden change in s. t. is observed, when a sudden change in e. m. f. occurs. Further addition of the metals causes only a slight change in e. m. f. There is no analogy to this behavior in the case of aq. solns. No explanation is suggested and no data are given.

J. L. CRENSHAW.

The Dissolution of a Metal in a Binary Solution, One Component Acid. A. R. JOHNSON. Univ. Wis. *Physic. Rev.*, 33, 27–42.—Mg was dissolved with const. surface in acid for a definit period of time, the evolved H being considered the measure of chem. activity. The cond. of the solns. was measured immediately before and after the action on the metal. It was found that the curves obtained by plotting H evolved and the cond. against acid concs. showed no such relation as would be expected from the electrochem. or ionization theory. J. regards the chem. activity curve "as the resultant of all other curves expressing relationships between conc. of acid in solvent and all other forces, as: mechanical, thermal, elec., and others." AcOH, HCl, tartaric and oxalic acids were studied in various solvents. J. C. HOSTETTER.

The Criterion of the Formation of a Compound by the Condensation of Two Gases.

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E. BRINER. Geneva. *Z. physik. Chem.*, 77, 245–9; cf. *C. A.*, 3, 974.—Polemical in reply to F. E. C. Scheffer. The view is defended that the practical test of the form of a compd. is complete condensation at all temps. without change in v. p. This holds only for compds. which in the gaseous phase are more or less dissociated, but practically undissociated in the condensed phase. Scheffer has attacked this view (*C. A.*, 5, 2358). R. H. JESSE, JR.

The Equilibrium: Solid-Liquid-Gas in Binary Systems which Present Mixed Crystals. II. H. R. KRUYT. *Proc. Akad. Wetenschappen* (English), 13, 206–10.—In a previous discussion (*C. A.*, 5, 1399) K. showed the forms which the line of the monovariant 3-phase equil. solid-liquid-gas can assume in such systems. The appearance of the 3 possible forms (max., min., or without max. or min.) depends on the difference of the triple-point pressures of the component and on the form of the melting diagram. The paper contains expts. on the system *p*-$C_6H_4Cl_2$ and *p*-$C_6H_4Br_2$, for which Küster (*Z. physik. Chem.*, 50, 65; 51, 222) has detd. the solid-gas equil. and the b. p. lines. By a combined *p-T* and *T-x* projection of the results obtained it is shown that the 3-phase line with a max. is the normal case in systems with mixed crysts., as well as in those with pure cryst. components. R. H. JESSE, JR.

Further Notes on the Nature of Solid Solutions. C. A. EDWARDS. *Engineering*, 92, 680–1.—Polemical. The author maintains that his conception that solid solns. are mixts. of very small crystals, is not contrary to the phase rule. D. A. MACINNES.

The Composition of Solid Phases in Four-component Systems. J. M. BELL. *J. Physic Chem.*, 15, 580–6.—A discussion of the methods for detg. in 4-component systems the comp. of solid phases from which the mother liquid cannot be entirely removed or which decomposes when washed. After recalling the fact that the comp. of one solid phase in contact with one liquid may be detd. by 2 oblique projections (Bell, *C. A.*, 2, 358) and by two orthogonal projections (Schreinemakers, *C. A.*, 2, 12) the author shows that it may also be detd. by 2 perspective projections upon the sides of an equilateral tetrahedron by lines through the opposit angles. In the case of 2 solid phases, it is shown that if one solid phase which is also a component of the system is known, perspective projection enables us to establish the ratio of the other 3 components in the unknown solid phase, but does not indicate the amount of the first component present in this phase. R. H. JESSE, JR.

Absorption Compounds (van Bemmelen). UGO PRATALONGO. Lab. chim. agrar. r. scuola sup. agric., Milano. *Gazz. chim. ital.*, 41, II, 382–412.—The comp. of the ppts. formed by bringing together solns. of Na silicate and aluminate, their solubility and their power of absorption from solns. of NH_4Cl and KCl were detd. The comp. varies continuously, the solubility seems to be a function of the relation between the solid and liquid phases, and absorptive power exhibits a lag effect, *i. e.*, the system is trivariant, consisting of 1 solid phase of variable conc., and is susceptible of permanent modifications. The various theories which have been proposed to explain absorption compds. are discussed; none are adequate to explain all the known facts. CHAS. A. ROUILLER.

Substantive Color Phenomena. V. G. SHAPOSHNIKOV. Polytechn. Inst., Kiev. *Z. physik. Chem.*, 78, 209–27.—Comparison was made of the substantive dyeing of cotton, mercerized cotton and artificial silk (all of which were first reduced to a high degree of purity without disturbing the chem. or physical properties of the basic substance) by pure dyes, those dyes containing the most S being chosen. The proportion of fixed dye was obtained by fusing the dyed cloth with NaOH and $NaNO_3$ and detg. $BaSO_4$ (a more rapid method depending on the detn. of N in dyes containing a high % of N is being developed by S.). The only important deviation from technical

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methods of dyeing was the omission of mineral salts. The experimental data were checked by the exponential expression for adsorption used in the logarithmic form and by an expression which connects Cf (the final conc. of dye on the fiber) and $10k$ (max. dye conc. on the fiber), thus: $C^2f + ACf - A.10k = 0$, where A is a constant. It is concluded that the substantive dyeing of cotton (cellulose) follows one and the same law regardless of whether the fiber retains its natural structure (pure cotton) or whether the structure is partially (mercerized cotton) or wholly (artificial silk) lost. Under the conditions of the expt. mercerized cotton was about 10% more intensely dyed than pure cotton; this may be taken as a criterion of the degree of mercerization. The relations between the effective dyeing on cotton of the dyes used are approx. those of their mol. wts. (this must be further verified). The following conc. relations were deduced. For any 2 dyeings the end concs. in the dye baths, *ceteris paribus*, are directly proportional to the differences between the max. and actual dye conc. on the fiber and inversely proportional to the bath moduli (wt. H_2O/wt. fiber to be dyed), regardless of the nature of the dyes. For 2 substantive dyeings with equal bath and dye moduli (dye modulus = wt. dye/wt. fiber to be dyed) the ratio between difference in dye conc. on the fibers and differences in dye conc. in the baths is numerically equal to the bath modulus. H. S. PAINE.

Phosphorescence of Organic Compounds at Low Temperatures. JOSEPH VON KOWALSKI. Freiburg i/Ü. *Physik. Z.*, 12, 956–69; cf. *C. A.*, 5, 2025.—The purified organic compds. were employed in alc. soln. at the f. p. of liquid air and illumination was by Hg lamp in quartz. For most substances there was found a max. of phosphorescence at conc. about 0.05 N, the intensity diminishing rapidly with increasing diln.; the phosphorescence due to unavoidable traces of impurities thus hardly influenced the main phenomenon. For *o*-, *m*- and *p*-xylene, cresols, cresol Me ethers, nitroanilines, nitrophenols, toluidines, aminobenzoic acids, and dihydroxybenzenes, phosphorescence was always most intense and of longest duration in the case of the *p*-compd., the *m*-compd. generally coming next. From the above and the study of C_6H_6, toluene, benzoic acid, aniline, aniline-HCl, PhOH, $C_6H_5NO_2$, C_6H_5Cl and *o*-, *m*- and *p*-chlorotoluene it is concluded that the intensity of phosphorescence is increased by the introduction of the single groups OH, COOH, CH_3, NO_2 and diminished by Cl; an increase in intensity due to several substituent groups can be detected with certainty only for the *p*-position and the action of Cl is also greatest when it stands in the *p*-position with another substituent. When the preliminary illumination lasted only a fraction of a second the spectrum of the phosphorescence was generally continuous (some substances showed marked differences in intensity in parts of the spectrum) and momentary, the long wave emission disappearing more quickly than that due to short waves. In case the preliminary illumination lasted over 1 sec. there appeared, displacing the spectrum of the momentary phosphorescence, the narrow band spectrum of a "progressive" phosphorescence which continued longer than the former. The intensity of the latter increased progressively with the duration of the preliminary illumination, approaching a max. asymptotically. In no case was phosphorescence observed at a temp. above —145°. Between —145° and —190° the duration of the "progressive" phosphorescence increased as the temp. was lowered while that of the momentary phosphorescence was not affected. Exam. of spectrophotographs of the "progressive" phosphorescence showed that the introduction of 1 or more substituents in the C_6H_6 ring diminishes the no. of double or triple bands. The single bands become less sharply defined and the extreme bands in the ultraviolet are displaced toward the red end of the spectrum; by introducing any substitutent whatever into the ring the scope of the spectrum is narrowed. CN, NH_2 and COOH groups cause a displacement toward the long wave end of the spectrum; all other monosubstituents studied cause a displace-

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ment toward the short wave end. Of bisubstituents it can be said that the extreme bands for *o*-compds. correspond to shorter wave lengths than for *p*-compds.; the more negative the character of a group the more pronounced is its tendency to produce displacement toward the long wave end of the spectrum. The effect of different substituents in causing diffusion of the bands varies with their nature and position in the benzene ring; the effect was greatest for the NH_2 group and least for the CN group. The effect of a substituent in a side chain is practically negligible compared with its effect in the ring. Comparison with absorption spectra data showed that for each absorption band of the substance there corresponds a group of bands in the phosphorescence spectrum which differ from the former by a practically constant vibration no. No definit conclusion could be drawn from comparison with fluorescence spectra. H. S. P.

The Fluorescence of Anthracene. LOUISA S. STEVENSON. Cornell Univ. *J. Physic. Chem.*, 15, 845–65.—After considering the existing theories of the fluorescence of org. substances, S. advances a chem. theory to the effect that light, when allowed to act on a fluorescent substance, causes some chem. reaction to take place. During this reaction or the reverse reaction light is given off. "This theory accounts for all known fluorescent anthracene derivatives and finds support in the evolution of light which takes place when Cl acts upon anthracene in the formation of dichloroanthracene. It was found that solns. of certain fluorescent substances when in the dark do not give off any light that can be detected even by long exposure to a Σ Lumière plate, and that although the dehydration of quinine sulfate gives off light, the reaction may take place so slowly that no light can be detected with a sensitive plate. L. H. ADAMS.

Photosensitive Antimonite Cells. WILLIAM S. GRIPPENBERG. Masaby, Finland. *J. Am. Chem. Soc.*, 33, 1761–2.—Antimonite (stibnite) has been shown by F. M. Jaeger to suffer a change of its elec. cond. upon exposure to light and to possess certain advantages over Se for the construction of photo-sensitive cells. A cell was made by clamping together a thin lamella of antimonite and a small grate of very small thin strips of Au or Pt foil. Such cells have a resistance between 10^6 and 5×10^6 ohms, are very sensitive and may be used without trouble with a p. d. of 30 volts. L. H. A.

A Method for Optical Control of Analyses. P. PASCAL. *Compt. rend.*, 152, 1852–5.—By limiting himself to the portions of the spectrum removed from the infra-red and by making the substitution $r = n^2 - 1 + k\lambda^2$, P. derives from Drude's modification of the Kettler-Helmholtz dispersion formula the expression for a lower limit, N, which approaches very closely to the number of electrons which influence the index of refraction n: $N = 1841 \times 10^{-14} Mr_1r_2(1/\lambda_1^2 - 1/\lambda_2^2)/d(r_1 - r_2)$ where M and d are the mol. and sp. wts. of the body whose index is measured by two known wave lengths λ_1 and λ_2. The value of N is generally very close to the sum of the valences (V) of the mol. There is a close relation between the electronic structure of the mol. and its diamagnetic properties, and between the valences and the diamag. props. The following general relations are pointed out: (1) An ethylene linking or a cyclization of an aliphatic compd. causes a diminution in the number of electrons which influence n. Two double linkages decrease N still more. This is exactly parallel to the depreciation in diamagnetism under the same conditions. Non-satn. is accompanied, then, by forces of combination between the electrons, which reduce their periods of vibration and thus reduce their effect on the visible spectrum. (2) In the allyl series, the optical effect of the double bond is almost lost. In the acetylene series the triple linkage has less effect than the double. These relations are again parallel to those between the constitution and the diamag. props. (3) The optical electronic method and the magnetic method both point to the absence of the Kekulé double linkage in benzene. (4) The halogens, except F, increase the number of electrons, generally

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about 2 for each atom. This effect is especially marked where the halogens are grouped around the same central at. This would seem to confirm the assumption made by the author from the results of magnetic measurements that the halogens possess supplementary valences. R. H. JESSE, JR.

The Color of the Light Emitted by Lampyridae. W. W. COBLENTZ. Bureau Standards, Washington, D. C. *Canadian Entomologist*, **43**, 355–60; *Physik. Z.*, **12**, 917–20.—Spectrophotographs and curves of energy distribution, showing actual differences in the light of various Lampyridae. The luminous segments are at a higher temp. than non-luminous segments, whether light is being emitted or not.
F. ALEX. MCDERMOTT.

Nature of the Light Emitted by Fireflies. SINGH AND MAULIK. *Nature*, **88**, 111.—Claim penetration of opaque objects by the light of *Luciola*.
F. ALEX MCDERMOTT.

Thermal Analysis in Quaternary Systems. III. N. PARRAVANO AND G. SIROVICH. Ist. chim. r. univ. Roma. *Atti accad. Lincei*, 20, II, 412–7.—Continuation of *C. A.*, 6, 178. CHAS. A. ROUILLER.

Absorption Spectra of Complex Inorganic Salts. ELENA VALLA. Univ. Pisa. *Atti accad. Lincei*, 20, II, 406–11.—The extinction and absorption coeffs. of 8 cobaltammine salts in $N/32$, $N/64$ and $N/128$ soln. at some 20 wave lengths are given. The spectrum from salt to salt and the absorption coeff. varies with the conc. For all except one salt, the spectrum shows a max. between 18 and 21 of the scale (9.50, 11.20, 16.00 and 27.90 on the scale correspond to $\lambda\lambda$6060, 5896, 5350 and 4607, resp.); the position of the max., for any given salt, is independent of the conc. within the limits investigated. The exception, $[Co(NH_3)_2(NO_2)_4]K$, has a spectrum entirely different from that of the other salts. CHAS. A. ROUILLER.

Absorption Spectra of Nitro Compounds in the Ultraviolet. N. ZELINSKII AND N. A. ROZANOV. Univ. Moscow. *J. Russ. Phys. Chem. Soc.*, **43**, 1173–83.—Following compds. were examd. by Hartley's method (*J. Chem. Soc.*, **47**, 685): $MeNO_2$, $EtNO_2$, $PrNO_2$, second. $PrNO_2$, $C(NO_2)_4$, $PhCH_2NO_2$, $C_6H_{11}CH_2NO_2$ nitrohexamethylene, 1,1-methylnitrohexamethylene and 1,1-methylnitropentamethylene. Some of these were also examd. in presence of NaOH or MeONa. The results reduced to a common diln. of 0.0001 *N* are represented by spectrograms. The conclusions are as follows: In general the value of absorption depends upon the mol. wt.; the transformation of a nitro compd. into a salt increases the absorption; the entrance of NO_2 into a mol. causes selective absorption and considerably increases the general absorption, which is in accord with Baly's theory of isorrhopesis (*J. Chem. Soc.*, **87**, 1332), but not with Hedley's assumption of quinoid rearrangement (*C. A.*, **2**, 2373). H. M. GORDIN.

The Positive Ionization from Hot Salts. O. W. RICHARDSON. Palmer Phys. Lab., Princeton Univ. *Phil. Mag.*, **22**, 669–703; cf. *C. A.*, **5**, 622–23.—The investigation has been extended to the following salts: $Be(NO_3)_2$, $MgCl_2$, $ZnCl_2$, $ZnBr_2$, ZnI_2, $Ca(NO_3)_2$. The results indicate that the positive ions emitted by heated salts are metallic atoms. These are not necessarily atoms of the salt under exam., but may be the atoms of some other metal (especially Na or K) whose salts are present as an impurity. Only singly charged positive atoms were obtained, discrepancies being attributable to admixt. of Na or K from impurity. Expts. (by Davisson) show that only a negligible fraction, if any, of the positive thermionic current from salts is carried by non-metallic ions, such as charged atoms or mols. of the surrounding gas. A large number of expts. have been made in order to measure the magnitude of the positive emission from salts under different conditions. In one series the central portion of a heated Pt strip was covered with a thin layer of the salt under exam.; in a second

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series the salt was contained in a Pt tube contained within a steel tube, heated electrically. With the strip method a very small emission occurs at very low pressures, and this increases rapidly with increasing pressure. The tube method makes the emission much less sensitive to variations of pressure at low pressures. The emission per unit area of the hot Pt seems on the av. to be greater with the tube method. It is suggested that efficiency in emitting positive ions depends on volatility in the possible compds. formed together with high electropositiveness of the metallic constituent. With the alkali and alk. earth groups the most electropositive are the most efficient emitters. In certain cases apparently the ionization is not emitted directly from the heated salt, but is produced by the action on the Pt of vapors evolved by the salt. The effect of changing the pressure at const. temp. is very different with different salts; these variations seem symptomatic of changes in the comp. of the material. Ions may play a fundamental and important part in chem. actions at high temps., as in solns. at ordinary temps. A. T. CAMERON.

Theory of Radiation Phenomena. A. JOFFÉ. St. Petersburg. *Ann. Physik*, 36, 534–52.—Attempts to extend the thermodynamical theory beyond the black body so as to include phosphorescence, etc. W. P. WHITE.

The Mode of Conduction in Gases. J. S. TOWNSEND. Elec. Lab., Oxford. *Phil. Mag.*, 22, 816–8.—Reply to Lodge (*C. A.*, 5, 3192). A. T. CAMERON.

Spectra of Electrodeless Ring Discharge in Certain Gases. H. DONALDSON. *Phil. Mag.*, 22, 720–7.—The expts. indicate a dependence of the spectrum of the gas (air, H, O, CO_2, etc.) on the elec. field producing the ionization. In the ring discharge the elementary line spectrum appears with the highest intensities of the field used, the band spectrum with intermediate intensities and the compound spectrum with the lowest intensities. ROBT. F. EARHART.

Separation of Spectra in Compound Gases. G. STEAD. *Phil. Mag.*, 22, 727–33.—In compound gases, an elec. discharge at low pressures produces 2 distinct spectra. The effect near the cathode is due to atoms which are supposed to carry positive charges. The differences in the 2 spectra are conditioned by: (1) Difference in temp. and elec. force at the 2 poles; (2) the electrochem. character of the elements concerned. R. F. E.

The Relation between Atomic Volumes and Spectra of the Elements. R. ROSSI. *Phil. Mag.*, 22, 922–5.—Mathematical, dealing with the relations between empirical formulas. R. F. E.

Difference in Photo-electric effect Caused by Incident and Emergent Light. OTTO STUHLMAN. *Phil. Mag.*, 22, 854–64.—The photo-electric effect is greater on the emergent side than on the side of incidence, the relative intensities ranging from 1.17 for Pt to 1.02 for Fe. If metals are arranged according to the periodic system, there is a periodic increase in the ratio of emergent to incident photo-electric effect. R. F. E.

The Heating Effect of the Currents in Precise Measurement of Electrical Resistance. R. T. GLAZEBROOK, W. R. BOUSFIELD AND F. E. SMITH. *Proc. Roy. Soc. London*, (*A*) 85, 541–56.—The only effect found was simply that due to the heat produced by the current. The belief that some other effect might be present was due to an underestimate of the temp. diff. between a wire and a stirred oil bath. If h, the thermal emissivity of a wire, is given from the experimental data by the equation: $h = 0.038\, C^2R/Lr\theta$, where C is current; L, length; r, radius; R, resistance; θ, temp. diff. from bath; then for bare wire in "well stirred" paraffin oil, h had the following values for wire 0.3 mm. in diameter: Ag, 0.037; Cu, 0.054; Al, 0.044; Ni, 0.061. From this it is calc. that Barnes' results on the mechanical equiv. may have contained an error of from 0.02–

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0.06%. Since with wires as large as 0.06 mm. the final temp. is nearly reached in 5 sec., this effect must be considered even with null methods. In water, streaming 100 cm. per sec., the effect was $^1/_{35}$ as great, but when the water flow was reduced to 1.37 cm. per sec. the effect was increased 20 times. The "emissivity" of a round wire in a liquid cooling agent is, other things being equal, inversely proportional to the square root of the radius. W. P. WHITE.

Imitation Hall Effect with Alternating Currents of High Frequency and a Sensitive Null Instrument which Utilizes it. H. ZAHN. Kiel. *Ann. Physik*, 36, 553–74.—The Hall effect apparently obtained with high frequencies is qualitatively of the right sign for different metals, but is some 50 times too great. It turns out to be of thermoelec. origin, due to eddy currents, etc.; its sign is a coincidence, and arizes because the sign of the Hall effect tends to parallel that of the thermoelec. power. It can be employed to detect phase changes and hence to measure quantities (as capacity) which affect the phase. W. P. W.

Note on a Method for Obtaining the Temperature Coefficient of Electrical Resistance. M. VON PIRANI. Wilmersdorf. *Ber. physik. Ges.*, 1911, 929, 30.—P. suggests the desirability of plotting more frequently the temp. coeff. of resistance as a function of temp., the temp. coeff. being defined as $(dW/dt)/W$ not $(dW/dt)/W_0$ where W_0 is the resistance at 0°, and W that at the temp. t. As example, curves for Fe and Ta are given. L. H. ADAMS.

Thermal Conductivity at High Temperatures. M. F. ANGELL. Univ. Wisconsin. *Physic. Rev.*, 33, 421–32.—A rod was heated electrically *in vacuo*, and the radial temp. diff. (20° in one case) measured thermoelectrically. The junction, which was 0.01 mm. thick, was covered with a ribbon, 0.01 mm. thick, of the same material as the rod. Results were then consistent. The total error is estimated at from 1% to 2%. The thermal cond. of Al increases with temp., that of Ni decreases as far as 1200°. The elec. resistance was also measured. Curves are given, but no other numerical data. Incidentally, a third phase of Ni was found above 700°. The elasticity of Ni was reduced by quenching; restored by annealing. W. P. WHITE.

The Thermoelectric Forces at the Transition from Solid to Liquid. P. CERMAK AND H. SCHMIDT. Giessen. *Ann. Physik*, 36, 575–88.—Koenigsberger and Weiss (*C. A.*, 6, 24) had found, in contradiction to most other investigators, that the thermoelectric power of Sn changed suddenly at the m. p. The present authors repeat the detn. for Pb and Sn, but find no indication of sudden change. The agreement was usually to about 1 microvolt. W. P. W.

Determination of Peltier Electromotive Force for Several Metals by Compensation Methods. A. E. CASWELL. Leland Stanford. *Physic. Rev.*, 33, 379–402.—A pair of Dewar-flask calorimeters was used. The temp. diff. caused by the Peltier heat was compensated either by a heating coil or by shunting part of the current away from the hotter junction. In the best instances the extreme divergence of the results was about 8% in 8 trials. The Peltier e. m. f. in microvolts against Cu, at room temp., was found as follows: Ag, 30; Al, 700; Pt, 800; Ni, 6000; Bi, 16100. These results agree with those of Jahn and Edlund rather better than they agree with each other. W. P. W.

The Influence of the Magnetic Field on Passive Nickel and Iron. HORACE G. BYERS AND AGNES FAY MORGAN. Univ. Washington. *J. Am. Chem. Soc.*, 33, 1757–61; cf. *C. A.*, 4, 1933.—The following conclusions were reached: The c. d. required to render Ni passive is materially increased when in a magnetic field, as was previously shown to be the case with Fe; steel when magnetized is more difficult to render passive than is the same steel unmagnetized and soft steel is affected to a greater extent than

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hard steel; the + pole of magnets is more easily rendered passive than is the — pole. L. H. ADAMS.

The Rational Relations of the Magnetic Moments of Molecules and the Magneton. P. WEISS. Zürich. *Physik. Z.*, 12, 935–52; cf. *C. A.*, 5, 1550.—A lecture in which recent work in this field is reviewed. J. J.

Alterations in the Physical States of Colloids (SCHORR). 11B. **Helium Tubes as Light Standards** (NUTTING). 21. **Force of Crystallization of Sodium Chloride** (RETZEL). 8. **Measurement of H^+ concentration of Sea Water** (PALITZSCH). 14.

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3. RADIOACTIVITY.

HERMAN SCHLUNDT.

An Attempt to Measure the Electric Conductivity of Radium. D. L. KOLOWRAT. Faculté Sci. Paris, Lab. Mme. Curie. *Radium*, 8, 401–4.—In 3 expts. 20, 125 and 120 millicuries of Nt resp. were forced into a narrow capillary tube of glass after being freed as far as possible from all traces of other gases, especially O. The capillary was furnished with 2 Pt wires of almost the same diameter entering the glass a few mm. apart, and in the first 2 expts., in order to insure good contact, the interior of the glass was silvered except between the Pt terminals. With a layer of Pb of the same thickness as that to be expected for the Ra D, the resistance should be about 40 ohms. The resistance was always greater than 10^6 ohms showing that no continuous deposit of metal had been formed. The Ag slowly disappeared, showing apparently minute residual traces of O, and to the same cause is attributed the non-appearance of metallic Ra D in the quantity expected. In the first expt., after 3 or 4 days, a brown ring appeared about midway between the electrodes, about a mm. in length, and giving a metallic reflection. It remained constant for 3 days and then slowly disappeared; heating did not cause it to reappear. The explanation suggested is that the Ra D was deposited metallically after most of the O had combined with the Ag, while the last traces of O slowly oxidized it and so caused it to disappear. A somewhat similar appearance was obtained in the 3rd expt. where other elaborate precautions were taken to get rid of last traces of O. A. T. CAMERON.

The Amount of the Radioactive Products Present in the Atmosphere. S. KINOSHITA, S. NISHIKAWA AND S. ONO. Phys. Lab., Univ. Tokyo. *Phil. Mag.*, 22, 821–40. —Two Cu wires, each 0.5 mm. thick, 27 m. long, and insulated at both ends, were horizontally stretched at heights of 6.5 and 1.5 m., resp., and were maintained at a potential of —11000 v. for periods of 4 and in some cases 24 hrs. The decay of activity of the active deposit was then measured and from the decay curve the amt. of activity due to Ra C and to the Th products and the amts. of the corresponding emanations were calculated. Measurements were made from April to Dec., 1910. The decay curves show that only Ra A and Th A are deposited on a negatively charged wire, and not other products such as Ra B, C, etc. If the mobility of the particles of Ra A be const. and equal to 1.3 (as calc. by Rutherford, *Phil. Mag.*, 5, 103 (1903)) the av. amt. of the Ra Em present in the atm. at Tokyo should be about 5×10^{-12} curie per cu. m. If the amts. of Th Em. per unit vol. are the same at equal heights, the ratio of the amt. of Ra Em. to Th Em. is 13000 : 1 at 6.5 m. above the ground, and 6,500 : 1 at a height of 1.5 m. The amt. of Ra Em. calc. is much smaller (on the av. about $^1/_{14}$) than that actually measured at Montreal, Chicago, and Cambridge. If the actual amt. of Em. at Tokyo is of the same order as elsewhere, it is suggested that the particles of Ra A become, while suspended in the atm., heavier (by aggregation with dust particles or water vapor) at a rate much quicker than that at which they are

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transformed into Ra B. If this is the case the ratios of Ra Em. to Th Em. become resp. 47000 : 1 and 24000 : 1. A fall in atmospheric pressure appears to increase the amt. of deposit. This must be due to an increase in the amt. of the emanations. The range of variation of the amt. of Ra deposit observed (9 : 1) is practically the same as that of the amt. of the emanation observed by Satterly (10 : 1; *C. A.*, 5, 244).

A. T. CAMERON.

The Solubility of Radium Emanation; Application of Henry's Law at Low Partial Pressures. R. W. BOYLE. Univ. Manchester. *Phil. Mag.*, 22, 840–54.—The differences in the results obtained by previous observers are pointed out and are attributed to their methods. Much larger quantities of emanation are used and the amts. in the gas and liquid phases have been measured by the γ-ray activity. Henry's law is shown to hold for the emanation between the partial pressures 8×10^{-4} and 8×10^{-6} mm. Hg. The following results are obtained for the coeff. of solubility of Em. in water: 0°, 0.506; 4.3°, 0.424; 5.7°, 0.398; 10.0°, 0.340; 14.0°, 0.303; 17.6°, 0.280; 20.0°, 0.245; 26.8°, 0.206; 31.6°, 0.193; 34.8°, 0.176; 35.2°, 0.170; 39.1°, 0.160. Thus at 10° a quantity of Em. will distribute itself between equal vols. of water and a gas so that about $^1/_3$ will go to the water and $^2/_3$ to the gas. The variation in temp. does not agree with Hofmann's results (*Physik. Z.*, 6, 337 (1905)). At 14° the Em. is slightly more sol. than NO. Hg does not absorb the Em. Sea water of sp. gr. 1.022 at 14° absorbs about 0.84 times as strongly as water. At this temp. pure EtOH absorbs 24.2 times as strongly as water, amyl alc. 30.7 times and toluene 45.2 times as strongly (cf. Ramstedt, *C. A.*, 5, 3757).

A. T. CAMERON.

The Concentration and Isolation of Radioactive Substances by Fractional Adsorption. E. EBLER AND M. FELLNER. Chem. Lab., Univ. Heidelberg. *Ber.*, 44, 2332–8.—A new method is described for the conc. of radioactive substances which has many advantages over the old methods of pptn. and fractional crystn. The method is based on the pronounced selective adsorption of certain colloids to many radioactive substances. If colloids are used which may be readily volatilized, as silicic acid can be done in the form of SiF_4, or as S by heat, the radioactive matter adsorbed by the colloid is left behind in conc. form. The process may then be repeated as often as necessary. With a very pure prep. of metasilicic acid it was found that Ra, Ra Em., Ra D, Ra E, Ra F and U X were all adsorbed from their solns. to a marked extent. The method of procedure consisted in dissolving a known quantity of the radioactive substance in a definit quantity of water. This was shaken at a const. temp. for several hrs. in sealed glass tubes with a definit quantity of the silicic acid. The acid was then sepd. by filtering, or centrifuging, and the filtrate evapd. The acid on the filter was driven off with pure HF, and the amt. of adsorption which had taken place detd. by measuring the activities of the 2 residues when they had reached a state of radioactive equil. It can be applied to the most dil. preps. as well as to the most conc. In case of rich preps. a vol of soln. may be used which is the most convenient to work with, a condition not possible when purifying by crystn. There is a greater conc. of the radioactive substances at each repetition of the process than is possible by methods of pptn. and crystn.

W. H. Ross.

Investigations on the Radium Content of Rocks. I. E. H. BÜCHNER. Chem. Lab., Univ. Amsterdam. *Proc. Akad. Wetenschappen*, 13, 359–65.—In order to confirm the high values (10^{-12} g. per g.) found by Strutt, Eve, Jolly, and others, for the Ra content of the earth's crust, B. has investigated rocks from the west coast of Sumatra. The rocks were fused with Na_2CO_3–K_2CO_3, the melt extracted with H_2O, the residue extracted with HCl, and finally dissolved in NaOH. This last soln. was added to the first. The emanation after equil. was reached was boiled out of the acid and alk. solns. into an emanation electroscope. The acid soln. contained almost all the Ra.

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The results are (g. × 10^{-12} per g.) as follows: Quartz porphyrite, river Malakoetan, 1.3; granit, Siboemboen, 2.5; basalt, Volcano of Asar, 13.0; andesite, Padang, 5.1; augite andesite, Soenhei Landei, 1.3; augite andesite, Ajer Kolbing, 0.56; granitite, River Pasier, 1.5; granitite, Soengei Lumani, 3.1; diorite, Ahoer Tampoeroengo, 0.30; diabase, Siboemkang, 0.34. II. *Ibid.*, 818–9.—Further measurements on sedimentary rocks give (g. × 10^{-12} per g.): *Marble:* from Carrara, 1.3; Valle del Po, 1.6; Auerbach, Bergstrasse, 1.7; Villmar, Nassau. *Limestone:* Silurian from Prag, 0.7; carboniferous from Düsseldorf, 4.3; trias from Jena, 0.4; lias from Württemburg, 2.1; lower chalk from Hanover, 0.3; cocene from Paris, 0.8; chalk, deluvial from Pietersberg, Maastricht, 1.5. The results are thus in agreement with measurements of Strutt, Eve, Schlundt and Moore, etc., but are on the av. about ½ as large as Jolly's.

R. H. JESSE, JR.

The Emission of Positive Charges by Heated Metals. G. REBOUL AND E. G. DE BOLLEMENT. Faculté Sci. Nancy, Lab. Phys. *Radium*, **8**, 406–11.—Blondlot noticed that when 2 electrodes, the one of Pt, the other of Cu, were arranged facing each other and heated for some hrs., an abundant black deposit was produced on the Pt (*Compt. rend.*, 102, 210 (1886)). The phenomenon has been investigated further. When a thin Cu band 0.5 mm. long is placed opposit a square strip of Pt, and the arrangement heated, an image of the Cu strip appears on the Pt. At a temp. of 900° this happens very rapidly, and the deposit reaches a max. thickness in 30 sec., after which it slowly fades. The max. is reached more slowly the lower the temp., requiring 30 min. at 400°. The deposit is formed in air, at reduced pressure and in vacuum, and also in O (more rapidly than in air), in N (less rapidly), and in CO_2 (still less rapidly). In the latter cases the deposit is gray, turning black on warming in air. CuO is also deposited in a similar manner on strips of Al, Ni, Au, and even on polished porcelain, but not on Ag; this is due to the fact that Ag volatilizes at about the same rate. White Ag deposits can be obtained on strips of Au and other metals. It is suggested that all metals possess the same property to a smaller extent, and the disappearance of the deposit is attributed to this fact on the one hand, and to a "fatigue" of the emitting metal on the other. The emission of positive charges and the intensity of the ionization present analogous characteristics. It is suggested that when the metal is warmed occluded gas (especially H and O) causes an explosion at the metallic surface. Such surface disruptions caused marked ionization. At the same time small particles of metal are projected outwards and strike the plate opposit. A microscopic exam. of the Cu strips after heating shows a ruptured surface well supporting the theory.

A. T. CAMERON.

Rays of Positive Electricity from the Wehnelt Cathode. CHAS. T. KNIPP. *Phil. Mag.*, **22**, 926–33.—A hot lime cathode emits positive carriers of electricity which do not have sufficient velocity to affect a photographic plate, but which may be accelerated by an elec. field to such an extent that photographic effects may be detected. The potential gradient necessary to produce the photographic effect is 500 v. per cm. The value of e/m is the same for the various carriers as that found in the case of positive rays formed by the ordinary perforated cathode with high potential discharge. The greater the acceleration of the charged particles the more clearly cut and well-defined are the photographs. The work was done with residual air in the discharge tube.

R. F. EARHART.

4. ELECTROCHEMISTRY.

C. G. FINK.

Water Power Development. PUBLIC POLICY COMMITTEE. *Proc. Am. Inst.*

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Elec. Eng., 30, 2503.—Engineering data are given. Over 40,000 sq. miles are covered by one single plant. At present a steam elec. plant can be built for $75 per h. p., while the cost of a hydraulic plant is 2–4 times this amt. There are now about 5,000,000 h. p. developed from water power with about 35,000,000 undeveloped. The steam source provides about 27,000,000 h. p. W. E. RUDER.

Contracts for the Supply of Electric Power from the Manufacturers Point of View. H. E. M. KENSIT. *Elec. Rev. West. Elec.*, 59, 1085.—Explanation of the real and apparent power consumed. The 90% basis specified by most power sellers is rarely possible of attainment. W. E. RUDER.

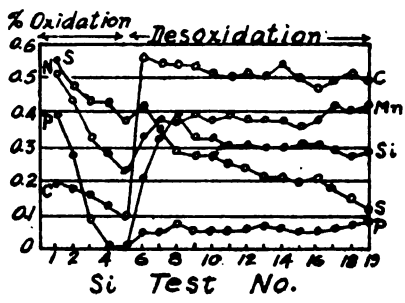
The Generating and Transmission System of the Telluride Power Company. ANON. *Elec. World*, 58, 1425.—A series of articles dealing with the Colorado and Utah systems of the company. The electrical and hydraulic features are described. W. E. RUDER.

Atmospheric Phenomena and their Relation to the Production of Over-voltages in Overhead Electric Transmission Lines. II. G. V. ADENDORFF. *Elec. Rev. West. Elec.*, 59, 983–6. R. W. MOORE.

The Experimental Determination of the Inductance of Linear Conductors. A. C. JOLLEY AND A. F. BURGESS. *Electrician*, 58, 316, 346.—Experimental attempts to verify the formulas commonly used show that Neumann's formula applies only to the field whose principal section is an area extending from the axis of the conductor to infinity and bounded laterally by two normals to the axis a distance apart equal to the length of the conductor. W. E. RUDER.

Progress Realized in the Reduction of Iron Ores in the Electric Furnace. G. ARNOU. *Lumière elec.*, 16, 269.—Tests show that the power consumption per ton of pig iron decreases with the capacity of the furnace. An economical electrode is described. Expts. are cited in which steel was produced directly from a 63% hematite ore in a 250 kw. furnace. The production of steel from pig iron in the elec. furnace is attended by difficulties, and for equal capacity furnaces, even of the smaller type, the production from pig iron requires higher power consumption than the direct production of steel or iron from the ore. C. H. ELDRIDGE.

Experiences in Electric Steel Manufacture in a Girod Furnace. A. MÜLLER. Oberhausen. *Stahl u. Eisen*, 31, 1165–72, 1258–64.—This experimental furnace is a 3-ton Girod furnace intended to take the product from a 25-ton Martin furnace for further purification. Tabulated details and results of operation are given and drawings of the construction and wiring of the 6 electrodes by which the furnace is heated. The metallurgical processes can be very accurately controlled so that the calc. additions produce a steel which corresponds very closely to that expected. The results on one of a large number of test runs given will be indicated here. The S and P content is multiplied by 10 in the diagram. The tests correspond to the following: (1) The cast iron used; (2) after the addition of 15 kg. ore; (3) 50 kg. more; (4) no addition; (5) just before removing slag; (6) 16 kg. Girod C., 5 kg. Fe-Mn; (7) 12 kg. Fe-Si (50% Si) and 40 kg. "refiner's slag"; (8) 4 kg. Fe-Si; (9) 20 kg. "refiner's slag;" (10) 3 kg. Fe-Si; (11) 2 kg. petroleum coke powder; (12) 1 kg. Fe-Mn (80% Mn); (13) 8 kg. CaO; (14 and 15) no additions; (16) 10 kg. CaO and CaF_2, 2 kg. petroleum coke powder; (17) 2 kg. Fe-Mn;



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(18 and 19) no additions. In general this furnace gives good results in the prep. of C-steels of the most varied character, as well as alloys such as Ni-, Cr-, Ni-V-, Cr-V-, Cr-W-steels for all sorts of special purposes. The analysis and physical tests of a large variety of steels made in this furnace together with a statement of special purposes to which they are adapted, are given. E. J. WITZEMANN.

The Present Status and Future Development of Electric Heating. C. A. ROSSANDER. *Lumière elec.*, 16, 233–40.—Familiar types of heating app. with metallic resistance units are described. The Heraeus resistors consist of porous SiO_2 impregnated with the NH_4 salt of one of the Pt metals. Comparative figures are given for gas and elec. heating. L. K. MULLER.

Kjellberg Electric Welding Process. ANON. *Engineering*, 92, 712.—The essential feature of the system consists in the use of a special electrode having a metal core encased in a surrounding coating, the constituents of which form a crater at the end of the electrode in which metal is fused out of contact with air and which also produces a reducing atmosphere around the arc, thus preventing oxidation of the weld. By varying the nature of the metal core different classes of welds are produced. In preparing work for welding, the edges to be joined are beveled off to form a V-shaped groove and the weld is built up with fused metal in the usual way. Welding can be done from below the work, the molten metal apparently being projected upwards and adhering to the work. Photomicrographs of welds are given showing perfect union of the parts and absence of impurities in the added metal. C. N. MOORE.

The Utilization of Nitrogen. F. HAVER. *Verhandl. Naturw. Ver. Karlsruhe*, 23, 17-30.—H.'s method and app. for NH_3 synthesis are described, and the efficiency of various methods of N fixation as cyanamide and HNO_3 discussed.
WM. P. GARRETY.

Present State of the Electrolytic Sodium Hydroxide and Chlorine Industries. MONTESSUS. *Chimiste*, 2, 341–2. E. J. C.

Recent Developments in Electrical Ozonizing Apparatus. ANON. *Electrochem. Z.*, 18, 187–222.—A review of German, American, French and British patents on the subject. W. E. RUDER.

Photographic and Photomicrographic Examination of Electrolytic Metal Deposits. II. B. WÄSER AND R. KÜHNEL. *Electrochem. Z.*, 18, 211.—Photographs are given of Cu deposited from various electrolytes. W. E. R.

Oerlikon Electrolyzers at the Army Aircraft Factory. G. WUTHRICH. *Engineering*, 92, 583–5.—Four electrolyzers were installed in 1910. They consist mainly of a no. of decomp. cells, connected in series, and provided with an automatically operated circulation arrangement for the soln. and the gases. The electrodes and diaphragms follow alternately, and are pressed together by means of a heavy screw and headstock plates. The electrodes are of special cast Fe, sepd. by diaphragms made of specially prepared asbestos which serves as an installation and packing medium and keeps the gases sepd. The electrodes are ruffled and subjected on the anode side to a secret process in order to suppress all polarization troubles and to prevent the formation of deposits or oxidation of the electrodes. The electrolyte used is a 10% soln. of the purest refined KOH in distilled H_2O having a max. sp. gr. of 1.10. The current efficiency averages 93%, when 1 kw.-hr. generates 59–60 cu. ft. of H_2 and about 3 cu. ft. of O_2. The standard app. generates gas at about $^1/_4$ atm. pressure. Under normal load conditions the H does not contain more than 1% O and the O_2 not more than 2.5% H. The electrolyzers easily stand with an overload of 20%. The decomp. voltage per cell. is only 2.2-2.4 v. They need overhauling after about 6 months of continuous running. C. N. MOORE.

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The Growth of Plants by means of Electricity. F. L. Cook. *Elec. Rev. West. Elec.* 59, 975, 6.—An account of expts. by Glorde on thest imulation of plants by high-tension elec. currents. In hot-house beds, a single galvanized Fe wire was embedded in the soil. About 4 ft. above was placed a network of wires, insulated from the supports, forming about a 12 in. mesh. At frequent intervals along this network, short brass chains were suspended. A current of 600 cycles, at 250,000 v., was applied to the two sets of conductors, and thus an elec. field produced in the space occupied by the flower beds. In an expt. with chrysanthemums, the plants grew much more rapidly, were much stronger and hardier, and showed twice as many blooms per plant. Fungus growths in the soil were killed. Roses and carnations gave 4 times the ordinary yield, a marked absence of stem rot being also noticed. In the open-air garden, with a similar arrangement, radishes were grown 3 in. in diam., which retained their flavor and were not pulpy or stringy. Tomatoes and corn grew to unusual size, at the same time keeping their uniformity of shape. Muskmelons developed rapidly and yielded an enormous crop. Melons and beets were made noticeably sweeter. R. W. Moore.

Arc Lighting. C. P. Steinmetz. *Gen. Elec. Rev.*, 14, 568–75.—In neither the flame arc nor the luminous arc is the light a temp. effect; it corresponds more nearly to a direct conversion of elec. energy into light, *i. e.*, "luminescence." The light is given by the vapor stream which conducts the current across the gap between the terminals and not by the tips of the terminals as in the old C arc. The *flame* arc is a C arc whose vapor stream is made luminous and light-giving by introducing into it mineral compds., mostly Ca salts. The electrodes are impregnated with these salts. The light-giving current is conducted by the C vapor but not by the salts. In the *luminous* arc the light-giving material is used as the vapor conductor. Fe and Ti compds. which are embodied into the negative electrode are mostly used. The comp. of the positive electrode is immaterial and is usually made non-consuming by giving it a size large enough to keep cool. In the flame arc the + electrode must always be an impregnated one. The color of the flame arc is yellow (Ca), that of the luminous Ti arc white. The luminous arc is more suited than the flame arc for low-power lighting units. The temp. of the luminous arc is about 2000°, that of the flame about 3700°, the b. p. of C. The efficiency of the yellow flame arc is 0.20–0.33 w. p. c., of the luminous arc. 0.33–0.50, and of the W incandescent lamp 0.80–1.25 w. p. c. S. discusses in detail the application of these 3 illuminants to street and indoor lighting.

C. G. Fink.

The Distribution of Current and the Variation of Resistance in Linear Conductors of Square and Rectangular Cross-section when Carrying Alternating Currents of High Frequency. H. W. Edwards. *Phys. Rev.*, 34, 184. W. E. Ruder.

The Distribution of Luminosity in Nature. H. E. Ives and M. Luckiesh. *Trans. Illum. Eng. Soc.*, 6, 687.—The surface brightness in certain examples of daylight illumination are studied by a photometric method (described in detail), with photographs and distribution diagrams. An analysis of actual pleasant daylight is then made. Complete reproduction of daylight in direction, intensity and diffusion does not necessarily give pleasant artificial illumination. C. H. Eldridge.

The Dependence of Visual Acuity on the Wave Length of Light. M. Luckiesh. *Elec. World*, 58, 1223, 1253–5.—A Hilger constant deviation spectroscope and the Ives acuity object were used in conjunction with a 500 watt W lamp. in a parabolic reflector. Readings for equal brightness were taken. The average of acuity readings at all points of the spectrum shows that for near vision (14 in.) visual acuity is a max. in the yellow-green region of the spectrum, and falls off considerably for the blue and red rays. Diagrams and plotted curves show the arrangement of the app. used, the

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change in comparative acuity with differences in wave length, and the relative change of acuity and brightness. W. L. VAN KEUREN.

Flow of Heat through Furnace Walls (HERING). 2. Apparatus for Metallography (HAYWARD). 1. Electrolytic Oxygen in Cyanide Solutions (ALDRICH). 9. Rays of Positive Electricity from Wehnelt Cathode (KNIPP). 3.

U. S., 1,013,022, Dec. 26. E. D. KENDALL. **Producing alumina from clays.**

U. S., Reissue, 13,343, Dec. 26. C. E. ACKER. Original Pat., 914,214, dated Mar. 2, 1909. **Making sodium amide.**

U. S., 1,011,258, Dec. 12. E. C. SMITH and E. L. MARSHALL. **Galvanic battery structure.**

U. S., 1,011,396, Dec. 12. W. G. ABBOT, JR. **Apparatus for treating filaments.**

U. S., 1,011,413, Dec. 12. W. H. CONE. **Decomposing sodium chloride solution.**

U. S., 1,011,485, Dec. 12. G. PFLEIDERER. **Electric battery.**

U. S., 1,011,503, Dec. 12. S. SHEPHERD. **Electric ozonizer.**

U. S., 1,011,708, Dec. 12. A. O. APPELBERG. **Working tungsten.**

U. S., 1,011,744, Dec. 12. J. B. CLAMENS. **Making bimetallic wire containing any desired low % of copper.**

U. S., 1,011,824, Dec. 12. O. LINDER and J. B. REPLOGLE. **Resistance unit variable by the action of light.**

U. S., 1,012,149, Dec. 19. I. PFEIFER and E. SZARVASY. **Making halogen derivatives of hydrocarbons.**

U. S., 1,012,470, Dec. 19. E. STEINBUCH. **Apparatus for electrolyzing fused alkali chlorides.**

U. S., 1,012,665, Dec. 26. A. A. LEMETRE. **Electroplating with zinc.**

U. S., 1,012,751, Dec. 26. W. TAYLOR. **Storage battery separator.**

U. S., 1,012,752, Dec. 26. *Idem.* **Storage battery separator.**

U. S., 1,012,828, Dec. 26. T. A. EDISON. **Storage battery structure.**

U. S., 1,012,845, Dec. 26. R. A. HADFIELD. **Increasing the permeability and resistance and reducing the hysteresis action of magnetic iron low in carbon.**

U. S., 1,012,889, Dec. 26. R. D. MERSHON. **Forming dielectric films on electrodes for use in electrolytic apparatus.**

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5. PHOTOGRAPHY.

LOUIS DERR.

Manufacture of Halogen-Silver Emulsions. W. H. CALDWELL. *Phot. Chronik*, 18, 483–4; cf. *C. A.*, 4, 2241.—To the finished emulsion a hydrazine salt is added *e. g.*, the neutral sulfate. The quantity is determined by the ratio 1 molecule of hydrazine hydrate to 4 of Ag halide. The developer must be so chosen as to work slowly or quickly, according as the film has received long or short exposure. L. DERR.

Transparencies and Prints in Color from Screen-plate Originals. E. STENGER. *Atelier Phot.*, 18, 97–100, 107–112, 122–4.—Summary of present methods, with full references. Prints leave much to be desired; transparencies are very satisfactory. L. DERR.

Comparative Studies on Photographic Intensifiers and Reducers. E. STENGER.

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Z. Reprodukt., 13, 132–7, 148–52.—In dist. water quinone acts like persulfate and has the advantage of reducing fog and leaving the image unaltered in color. In water containing Cl the action approaches that of the ferricyanide reducer, the more as the Cl content increases. L. DERR.

Photographic Impressions on Copper. G. REBOUL. *Compt. rend.*, 153, 1215–7.—A polished sheet of Cu, exposed to Cl or Br vapors and then insolated in a printing frame under a negative, gives a sharply defined positive print, the sensitiveness of the plate decreasing with increasing thickness of the halogenized layer. The original image is unstable, disappearing spontaneously after a time, and cannot be fixed; but dil. Ag or Au solns. containing hypo give stable images by deposit of the metal on the insolated parts while the hypo dissolves the unaltered halide away. The insolated halide is pulverulent and can easily be dusted off the plate. L. DERR.

Color Prints on Utocolor Paper. R. STAHEL. *Phot. Rundschau*, 25, 281–5.—The present product is capable of improvement; it gives, except for blues, good but not vigorous color reproductions when used for copying autochromes or omnicolor pictures, the faithfulness of color reproducing depending somewhat on the original plate. L. DERR.

The New Utocolor Paper. O. MENTE. *Atelier Phot.*, 18, 138–41.—See preceding abstr. L. D.

Metol Developer without Alkali. R. RENGER-PATZSCH. *Phot. Rundschau*, 25, 286–9.—The developer used was metol sulfite, sometimes with and sometimes without a preliminary 1% KBr bath. With factorial development, a factor 5–10 gave soft results, 10–20 normal gradation, 20–30 excessive contracts. In most cases the time of development was excessively long. L. DERR.

Ripening of Finished Dry Plates by Ammonia Vapor. H. LÜPPO-CRAMER. *Phot. Rundschau*, 25, 289–90.—Six photomicrographs show the very considerable enlargement of grain by the action of NH_3 for times up to 6.5 hrs. The larger aggregates grow by withdrawing to themselves the AgBr from the surrounding gelatin. L. DERR.

6. INORGANIC CHEMISTRY.

H. I. SCHLESINGER.

Advances in Experimental Inorganic Chemistry in 1910. J. D'ANS. *Chem. Ztg.*, 35, 1281–2, 1291–2, 1305–8, 1322–3. J. J. M.

Existence of a New Type of Dioxides. Reaction between Selenous Acid and Manganese Dioxide. L. MARINO AND V. SQUINTANI. Ist. chim. gen. univ. Pisa. *Gazz. chim. ital.*, 41, II, 324–31; cf. *C. A.*, 5, 3386. CHAS. A. ROUILLER.

Ferromagnetic Compounds of Manganese with Phosphorus, Arsenic, Antimony and Bismuth. SIEFRIED HILPERT AND THEODOR DIECKMANN. Tech. Hochsch., Berlin. *Ber.*, 44, 2831–5; cf. *C. A.*, 6, 42.—All ferromagnetic substances lose their magnetism when heated above a certain temp., but become magnetic again when cooled. This temp. is called the critical temp. The critical temp. of the compds. formed by Mn with the elements of the 5th group of the periodic system follow in the same order as the at. wts. of these elements. *Manganese phosphide* loses its magnetism at 18–26°, the arsenides at 40–45°, the antimonide at 320–330°, and the bismuthide at 360–80°. *Manganese phosphide* is prepared by heating Mn and P in a sealed tube at 1600°. It is a black, odorless powder, burning in the air, forming a ferromagnetic black oxidation product. *Manganese antimonide* was prepared by

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heating the calc. amt. of Sb in an atm. of H. The *bismuthide* was prepared in a similar manner. It is questionable whether the antimonide is a chem. compd.

LILLIAN COHEN.

Interaction of Metallic Oxides and Phosphoryl Chloride, Alone and in the Presence of Certain Organic Solvents. H. BASSETT, JR., AND H. S. TAYLOR. Univ. Liverpool. *J. Chem. Soc.*, 99, 1402–14; *Proc. Chem. Soc.*, 27, 155.—Slowly at ordinary temp. but readily at 110° in a sealed tube, $POCl_3$ reacts with CaO, MgO, MnO and ZnO, yielding a soln. which, on cooling, deposits crystals of $CaO.2POCl_3$, $MgO.2POCl_3$ or $MgO.3POCl_3$, $MnO.3POCl_3$ and $ZnO.3POCl_3$. With a number of other oxides the reaction is more complex and yields mainly chloride of the metal. If the $POCl_3$ is dissolved in Et_2O, acetone, acetic, benzoic, oxalic or trichloracetic ester before the oxide is added, cryst. compds. of the type $MO.P_2O_2Cl_4.2X$, where X is organic solvent, are obtained if the solvent is added to the addition compds. above mentioned. Moisture must be well excluded by using a sealed tube or a vessel connected with a drying app. Apparently the addition compd. is first formed and then this is acted upon by traces of moisture in the solvent in such a way as to eliminate both P and Cl and cause the addition of some of the solvent. D. M. LICHTY.

Titanium. A. STÄHLER AND F. BACHMAN. Chem. Lab., Univ. Berlin. *Ber.*, 44, 2906–15.—Continuation of previous work (see *Ber.*, 37, 4405; 38, 2620; *C. A.*, 4, 33). $TiCl_3$ was prepared from $TiCl_4$ and H. The dichloride was then prepared by reaction $2TiCl_3 = TiCl_2 + TiCl_4$, by heating to 660° in an atm. of H. The residual $TiCl_2$ was somewhat impure, containing Ti. Ti of 94% purity was obtained by further distillation of this in an atm. of H at 1100°. ($2TiCl_2 = TiCl_4 + Ti$).O from SiO_2 present in the app. prevented greater purity. Attempts to obtain reduction products from $TiCl_4$ by S compds. were without results. Complex double formates were prepared from trivalent Ti and NH_4, K and Ba. These are unstable and can be used as mordants. $TiCl_3$ was applied (like $SnCl_2$) as a test for Au. H. GRUENER.

Berlin Blue and Turnbull's Blue (MÜLLER). 25.

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7. ANALYTICAL CHEMISTRY.

E. G. R. ARDAGH.

Simplification in Gravimetric Analysis. ERNST MURMANN. Pilsen. *Z. anal. Chem.*, 50, 742–7.—To diminish the time required for filtration, the author uses a porcelain funnel with perforated plate, and filters with suction. The filter paper, after drying, often becomes loose from the plate and is readily removed. Substances may be weighed on the filter which in ordinary cases should be 12–15 mm. in diam. and will absorb little moisture. For gelatinous ppts. like $Al(OH)_3$, MnS and ZnS, addition of a little of the finest starch or HgS or finely shredded paper is recommended. A description is given of an app. for filtering with suction by which the filtrate can be collected in the required vessel. JOHN WADDELL.

The Use of Methyl Red for Colorimetric Determination of Hydrogen Ion Concentrations. SVEN PALITZSCH. Carlsberg Lab., Copenhagen. *Biochem. Z.*, 37, 131–4.—Methyl red, or *p*-dimethyl aminoazobenzene-*o*-carboxylic acid (cf. *C. A.*, 3, 523) is recommended for measurement of H^+ conc. between $10^{-4.2}$ and $10^{-6.2}$.

D. D. VAN SLYKE.

Determination of Perchloric Acid in Certain Perchlorates. HENRYK GOLBLUM. Univ. Geneva. *Z. anal. Chem.*, 50, 741–2.—The ordinary method applies only to alk. perchlorates. To det. the comp. of Ni and Co perchlorates, G. used a current

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of 0.1 amp. which, on account of the resistance of the electrolyte, requires 10–12 v. 0.2 g. of metal was completely deposited in 70 hrs. on a Pt gauze electrode. The $HClO_4$ produced was titrated with 0.1 *N* HCl and phenolph., and agreed with the metal deposited. The perchlorates proved to be $Ni(ClO_4)_2.5H_2O$ and $Co(ClO_4)_2.5H_2O$.

JOHN WADDELL.

Determination of Silica in Iron Ores. F. MOLDENHAUER. Garrucha-(Almeria). *Z. anal. Chem.*, 50, 754–5.—M. found that the SiO_2 of Fe ores was greater when evapd. in a Pt than in a porcelain dish. The latter was found to gain in wt., doubtless because SiO_2 in a colloidal condition adheres so firmly to the porcelain that it cannot be removed. With a Pt dish, duplicates should agree within 0.1% instead of the 0.5% usually allowed.

JOHN WADDELL.

A Simplified Test for Fluorine. E. RUPP. *Z. Nahr. Genussm.*, 22, 496.—The ashed material is placed in a Pt crucible about 3 cm. high, or in a Pb tube closed at one end and about 5 cm. long by 2 cm. in diam. Three drops of water and 1 cc. conc. H_2SO_4 are added. The container is then closed with a perforated rubber stopper through which is passed a smooth tipped glass rod extending about 3 mm. below the stopper. A drop of water is suspended on the tip of the rod. The mixt. is heated for 20–30 min. on a b. water bath. In the presence of F a coating of H_2SiO_3, Na_2SiF_6 and $CaSiF_6$ appears on the tip of the rod. The etching of the glass surface may also be detected by drawing it over the teeth. Even traces of F are said to be detected by this means. When a tall crucible only is available the glass rod may be pushed through the stopper until it is $2–2^1/_2$ cm. above the mixt. and all but the tip of the rod may be covered with a rubber tube.

P. B. DUNBAR.

Investigation of Nickel and Cobalt Ions when Occurring together. Study of some New Reactions. ANGEL DEL CAMPO Y CERDAN AND JAIME FERRER. Madrid. *Anales soc. espan. fis. quim.*, 9, 201–13, 272–76; *Rev. real. acad. cien., Madrid*, 9, 979–95; cf. *C. A.*, 5, 3392.—Of a number of xanthogenates studied K Me xanthogenate was chosen as the most suitable reagent for differentiating Ni and Co. For detecting Ni in presence of Co use a 1 : 1000 aq. soln.of the reagent and slightly acidify with AcOH the soln. to be tested. To 2 cc. of the latter add, pouring down the side of the test tube, 1 cc. of the reagent. The Ni ppt. is cryst. and appears at once, while the Co ppt. is colloidal and appears slowly; if Ni is present, there first appears a yellow zone which in the presence of Co and with further addition of the reagent becomes green. To detect Co in presence of Ni use the reagent in conc. 5 : 100 or greater (in order to ppt. all Ni) and proceed as above. A green color indicates Co; in the absence of this color add NH_3 water in conc. 3 : 100. Any Ni ppt. is thereby dissolved, leaving a green ppt. if Co is present. Comparison of this reagent with dimethylglyoxime (Chugaev's reaction) for detection of Ni alone showed that both are equally sensitive and are capable of detecting Ni in conc. 1 : 100,000. For detecting Ni when present with 10 pts. Co the K Me xanthogenate acts poorly for Ni conc. below 1 : 40,000 (best for conc. above 1 : 1000), while dimethylglyoxime is most sensitive for conc. between 1 : 1000 and 1 : 50,000. Ni in the presence of 50 pts. Co can be detected by K Me xanthogenate in conc. 1 : 25,000 and, in presence of 100 pts. Co, in conc. 1 : 20,000, dimethylglyoxime being sensitive in the last case only for Ni conc. above 1 : 10,000. It was possible to detect Ni by the former reagent in presence of 200 pts. Co. For the detection of Co, when alone or in presence of an excess of Ni, K Me xanthogenate and Vogel's reagent (NH_4SCN and amyl alc.) are equally sensitive. The sensitiveness of the former reagent is practically the same for Co and Ni. When there is doubt as to the color change in using the reagent, the soln. should be filtered and the color of the ppt. observed after washing. More NH_3 water is required to effect soln. of the Ni ppt. when Co is present in excess.

H. S. PAINE.

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Determination of Phosphorus in Steel and Iron. C. REICHARD. *Pharm. Zentralhalle*, 52, 1314–5.—The advantages of working with a smaller quantity of the sample, 1 g. in place of 5 g., are pointed out. Only when the % of Si to be detd. is very small, should as much as 5 g. be used. The HNO_3 soln. is evapd. over a sand bath and the Fe converted into the oxide. The NH_4 phosphomolybdate is allowed to deposit during 12 hrs., filtered through asbestos, and dried at 160° for weighing. The ppt. may be converted, by heating, into phosphomolybdic anhydride with good results. Conversion into $Mg_2P_2O_7$ whose mol. wt. is much lower is not recommended.

A. VORISEK.

The Volumetric Determination of Mercury According to Denigès. F. TOGGENBURG. Lab. of Niggli & Co., Zürich. *Schweiz. Wochschr.*, 49, 641–4.—Soln. of the mercuric salt is treated with a definit excess of 0.1 *N* KCN soln., then titrated back with 0.1 *N* $AgNO_3$ in NH_3 soln. in presence of KI as indicator. There are slight, not negligible deviations from calc. results on known amts. of Hg salt. D. (*Bull. soc. chim.*, [3] 1896, 862) has given a correction formula with the method, but T. concludes that each analyst must establish his own correction table by comparing experimental and calc. results from known amts. of Hg salt. The method is especially useful for serial work.

S. WALDBOTT.

Graphic Methods for Niter Assay Calculations. P. D. WILSON. *Eng. Mining J.*, 92, 1262.—In the practical application of the niter method for assaying Au and Ag in sulfide ores, a preliminary fusion is necessary when the comp. of the ore is not known, and from the Pb button obtained the amt. of niter in the charge necessary to yield a suitable button is calc. In a pure sulfide ore, the preliminary fusion may be dispensed with if the S tenor is known. W. presents a diagram giving the necessary amts of KNO_3 after the S content has been detd.

ROBERT KANN.

Reactions of Pyramidon. A. MOULIN. *Ann. chim. anal.*, 16, 220.—Pevenasse first called attention to the blue color which pyramidon gives with HNO_2, and which disappears in the presence of an excess of acid. Treating a soln. of pyramidon with $HgNO_3$, $AgNO_3$ or fuming HNO_3 yields blue, whereas pure HNO_3, $Pb(NO_3)_2$, KNO_3 and $NaNO_3$ act negatively. All oxidizing agents, except pure HNO_3, when brought into contact with powdered pyramidon, yield a reaction similar to the reaction of oxidase on acacia, *viz.*, yellow surrounded by blue-black ring, rapidly changing to pale blue.

W. REGNAULT.

Use of Carbon Disulfide in the Direct Estimation of Sulfur in Ores. N. LEVY. *Bull. assoc. chim. sucr. dist.*, 29, 218–20.—A certain wt. of the finely pulverized ore is treated with CS_2, the ext. evapd. to dryness, and the residue weighed. The inflammability of CS_2 makes it necessary either to allow the soln. to evap. in cold, or, as L. recommends, to distil from a test tube, with a layer of water over the CS_2, through a long condenser, into water. The S remains in the test tube as a layer of liquid floating on the water. It is washed and weighed on a tared filter.

WM. E. CROSS.

Volatilization of Gold and Silver from their Copper Alloys. EDWARD F. KERN AND ALBERT A. HEIMROD. *School Mines Quart.*, 33, 34–64.—The methods of analyzing the Cu alloys are: For Au: Dissolve 1 *A T* in 20 cc. H_2O and 90–100 cc. conc. HNO_3, the acid being added in instalments of 20–25 cc. from time to time. After soln., add 40 cc. conc. H_2SO_4 and evap. to fumes. Cool, dil. to 500 cc., add soln. of 10 g. cryst. $FeSO_4$, followed by 25 cc. satd. soln. of NaCl. Then stir in enough $AgNO_3$ soln. to give a bead weighing about 8 times that of the Au present. Filter, and wash off all Cu. To the ppt. add 20 g. test Pb, dry and burn off slowly in a scorifier glazed with PbO. When the paper is burned off, add 20 g. more test Pb, and a pinch of borax. Scorify, cupel and part as usual. For Ag: Dissolve 5–20 g., according to

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the proportion of Ag, in HNO_3 (3 cc. HNO_3 per g. of alloy). Evap. until $Cu(NO_3)_2$ begins to cryst. out, and all lower N oxides are expelled. Add 400 cc. cold H_2O, and then stir in 25 cc. satd. soln. NH_4CNS. Filter, and wash off all Cu. Digest, filter and ppt. in the original beaker with 80 cc. conc. HNO_3, and evap. low, but not to the point of partial carbonization of material from the filter paper. Dil. with 300 cc. H_2O, and ppt. out SO_3 (from oxidation of NH_4CNS) by 20 cc. satd. soln. $Ba(NO_3)_2$. Add soln. of Fe alum as indicator, and titrate with standard NH_4CNS (3.2 g. per l.). Segregation was avoided by granulating the alloys. The conclusions were: Ag was not volatilized on heating Cu containing 113–1311 oz. per t. to above the m. p. of the alloy in contact with C for $27^1/_2$ hrs. Pure Au volatilized at 1350° when heated for 28 hrs. in covered porcelain crucibles. Au volatilized from Cu containing 10–100 oz. per t. when heated in contact with C to between 1130 and 1450°. In 10 hrs. the losses were small, but after 14 hrs. they were high, and increased rapidly. Apparently Au carbides formed which are volatil at something over 1100°. Cu slowly absorbs C when heated with it for some time at temps. above its m. p. After becoming satd. with C, there is a rapid loss by volatilization. In 10 hrs. the loss is insignificant but increases with time, being very rapid after 23 hrs. heating. Au forms a eutectic with C when heated in contact with it at above its m.p. for a long time. Samples heated in this way for 28 hrs. above 1100° showed them to contain over 0.7% C. The carbide was volatil at above the fusion point of the metal. E. WALLER.

Analysis of Lime Liquors (BENNETT). 29. Kobert's Reagent as Test for Salicylic Acid (McCRAE). 12. Sulfur in Petroleum (LOHMANN). 22.

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8. MINERALOGICAL AND GEOLOGICAL CHEMISTRY.

ROGER C. WELLS.

Transformation of Aragonite into Calcite. P. N. LASHCHENKO. Don Polytechn. Inst. *J. Russ. Phys. Chem. Soc.*, 43, 793–803.—Detns. of the heats of cooling (K) of aragonite and calcite showed that up to 445° K is the same for both. Between 445° and 460–5° K is the greater for aragonite than for calcite, and the difference increases with the temp. Above 465° K for aragonite gradually diminishes, becoming identical with K for calcite at 470°. Above 600° there is again a slight divergence. This shows that the transformation of aragonite into calcite begins at 445° and is complete at 470°. This is corroborated by detns. of the sp. gr. at the different temps. The beginning of the transformation is characterized by the crystals becoming turbid and the absorption of considerable heat; at 470° the turbidity disappears.

H. M. GORDIN.

Note on some Artificially Produced Crystals of Gypsum. MARK FLETCHER. *Min. Mag.*, 16, 137–40.—The crystals were deposited in an app. used for the production of distilled water. The water used was shallow well water containing 53.6 parts of $CaSO_4$ per 100,000. They are prismatic in habit with pyramidal terminations. The presence of twinning is betrayed by "herring-bone" striations on $b(010)$. The twinning plane observed is rather unusual being parallel to $d(101)$. The formation of smaller untwinned crystals of gypsum in the early stages of deposition and of the larger twinned crystals at a later stage, suggests that the production of the latter was influenced by the conc. of the soln., either of the $CaSO_4$ itself, or of the associated salts. A later deposit of $CaCO_3$ (aragonite) was noted on the larger twinned crystals of gypsum.

W. F. HUNT.

Schwartzembergite. G. F. HERBERT SMITH AND G. T. PRIOR. *Min. Mag.*, 16,

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77–84.—The specimens examined came from the San Rafael mine, Sierra Gorda, Caracoles, Chili. They were honey-yellow to reddish brown in color, gave a straw-yellow streak, and were associated with gypsum, percylite, paralaurionite (rafaelite), and corroded quartz. The square crystals with rounded bipyramids resemble flat cones, while a study of the optical properties reveals a pseudo-tetragonal symmetry. Biaxial interference figures of negative birefringence are obtained on each of the pyramidal faces. Clear, transparent fragments of large crystals gave the following: Pb = 75.07; CaO = 0.67; Cl = 7.96; I = 8.64; SO_3 = 0.47; O and loss = 7.19. The I was considered present as iodate and not as iodide, as Cl was given off when a fragment was treated with HCl. Also, when dissolved in cold HNO_3 the I was in the form of iodate. We have then the following: PbI_2O_6 18.95, $PbCl_2$ 31.17, PbO 48.29, CaO 0.67, SO_3 0.47, total, 99.55. Formula $3(PbCl_2.2PbO).PbI_2O_6$.

W. F. Hunt.

An Example of Quartz Twinned on the Primary Rhombohedron. Julien Drugman. *Min. Mag.*, 16, 112–8.—Only 3 other isolated examples of quartz so twinned have thus far been recorded. This twinned crystal was found in the Esterel Mts., near Cannes, in southern France. The rock containing it is a laccolitic quartz-diorite. The specimen consists of 2 nearly equal bipyramids joined parallel to an R-face. Above there is a reëntrant angle of —27° 8′ and below, in the same zone, a salient angle of +27° 8′. Many of the crystals from this locality show a distinct prismatic cleavage.

W. F. Hunt.

Notes on Cassiterite in the Malay Peninsula. J. B. Scrivenor. *Min. Mag.*, 16, 118–21.—At the Kinta Tin Mines, Gopeng, Perak, boulders of cassiterite were found containing so much Fe in chem. combination (iron oxide not included) as to be attracted by an electromagnet. At the Pussing Bharn mine in the same district a replacement-pseudomorph was found consisting of cassiterite and tourmaline after an hexagonal mineral, probably quartz, but no trace of the pyramidal faces was preserved. This specimen may be regarded as analogous to the well-known replacement pseudomorphs of cassiterite after orthoclase, found in Cornwall.

W. F. Hunt.

The Relation between Rathite, Rathite α, and Wiltshireite. R. H. Solly. *Min. Mag.*, 16, 121–4.—Crystallographic study pointing out the identity of rathite α with wiltshireite, and the very close relationship existing between this mineral and rathite. No chem. analyses are given.

W. F. Hunt.

Fermorite, a New Arsenate and Phosphate of Lime and Strontia and Tilasite from the Manganese Ore Deposits of India. G. F. Herbert Smith and G. T. Prior. *Min. Mag.*, 16, 84–97.—*Fermorite:* Pale pinkish white to white mineral occurring in veins in the manganese ore, which at Sitapar, Chhindwara district, Central Provinces, consists of a mixt. of braunite, hollandite, pyrolusite, and sitaparite. Translucent with a greasy luster. No well crystallized specimens were found. Probably isomorphous with apatite; sp. gr. = 3.518. Uniaxial and negative, low double refraction with a mean index at 1.660. Readily sol. in HCl or HNO_3. CaO = 44.34; SrO = 9.93; As_2O_5 = 25.23; P_2O_5 = 20.11; F = 0.83; insol. = 0.08; less O for F = 0.35; total = 100.17. Analysis corresponds fairly closely to the formula $3[(Ca, Sr)_3 (P, As)_2O_8].Ca(OH, F)_2$. *Tilasite:* Pale green fluoarsenate of Mg and Ca resembling somewhat apatite in appearance from Kajlidongri, Jhabua State, Central India. It is identical with the tilasite from Sweden described by Sjögren. The crystals are monoclinic, and probably domatic as they showed elec. polarity by Kundt's method. $a : b : c$ = 0.7503 : 1 : 0.8391; β = 120° 59½′. H = 5. Bx_a is perpendicular to the cleav., double refraction negative, and the plane of the optic axes is at right angles to the plane of sym. α = 1.640 : β = 1.660 : γ = 1.675. 2V = at 82° 44′. Easily fusible and readily sol. in HNO_3 and in HCl. Analysis of the pure material showed: As_2O_5 =

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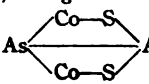
50.35; P_2O_5 = 0.43; FeO = 0.55; CaO = 25.68; SrO = 0.06; MgO = 183.4; F = 7.18; H_2O = 0.73; insol. = 0.05; less O for F = 3.02; total = 100.35. Formula, approx. (Mg, F)$CaAsO_4$. Sp. gr. 3.77. W. F. HUNT.

A Large Uraninite Crystal from German East Africa. R. BRAUNS. Min. Inst., Univ. Bonn. *Centr. Min.*, 1911, 689–90.—The specimen is a rough cube with dodecahedral faces 3.5 × 2.5 × 2 cm. in diam., weighing 154 g. It is coated with rutherfordite (UO_2CO_3). E. T. WHERRY.

The Crystal Form of Celestite. M. HENGLEIN. Karlsruhe. *Centr. Min.*, 1911, 692–7.—Results of measurements and a complete angle table are given. E. T. WHERRY.

Chemico-mineralogical Studies on Cobaltite. A. BEUTELL. Min. Inst., Univ. Breslau. *Centr. Min.*, 1911, 663–73.—A specimen of the comp., S 21.48, As 42.88, Fe 2.92, Co 32.36, Ni 0.32, sum 99.96, was heated in a high vacuum, and gave off As and S in proportional amt. The constitutional formula is thus probably As  As.

Since glaucodot yielded a different type of formula (*C. A.*, **5**, 3667) their dimorphism is referable to chem. isomerism. E. T. WHERRY.

The Crystallin Form of Nitrogen Sulfide. G. F. HERBERT SMITH. *Min. Mag.*, 16, 97–100.—The nitrogen sulfide was recrystallized from benzene, washed with CS_2 and benzene, desiccated over $CaCl_2$ and coconut charcoal, and then sublimed *in vacuo* over Ag gauze heated to 100° in a steam jacket. Measurements agree closely with those recorded by Artini. Monoclinic, resembling bevelled cubes, $a : b : c$ = 0.8879:-1 : 0.8480 : β = 90°23′. On all crystals the faces were striated due to polysynthetic twinning parallel to (101). Orange-red in color with a straw-yellow streak. Transparent and brilliant when fresh, but crystals lose their luster on exposure to damp air. The plane of the optic axes is parallel to plane of sym. and the double refraction is strong and positive in sign. W. F. HUNT.

Further Remarks on the Electrostatic Separation of Minerals. T. CROOK. *Min. Mag.*, 16, 109–12.—Attention is called to a simple electrostatic method whereby, using a stick of sealing wax and a Cu plate, grains of a metallic or sub-metallic mineral can generally be sepd. from the more transparent minerals, *i. e.*, sepn. of a small amt. of cassiterite grains from a large quantity of zircon. For the isolation of a small amt. of xenotime from a mixt. of wolframite and ilmenite, a second Cu plate with the under side coated with shellac and with insulating supports is employed instead of the stick of sealing wax. The grains are placed on the uncoated Cu plate, contact being prevented by the insulating supports, while the upper plate is charged by means of an electrophorus. The conductors will be attracted to the shellac covered face to which they will adhere. W. F. HUNT.

The Force of Crystallization of Sodium Chloride and its Dependence on the Solvent. A. RETZEL. Jena. *Z. Kryst. Min.*, 49, 152–92.—R. was able to measure the difference in C for different crystal faces of NaCl by using a conc. soln. and applying the equation, $A = K(C - c)O$, where A is the rate of soln., C the conc. of a satd. soln., c the conc. of the soln. used, and O the surface exposed to the solvent. The octahedron is more sol. than the cube in a water soln. but on adding more than 5 g. of urea to 100 cc. of water, the cube becomes the more sol. form. The addition of formamide causes the same result but the addition of KNO_3 had no apparent influence on the relative solubility of the 2 forms. In agreement with the above results, the cube was pptd. from water soln. while the octahedron was pptd. when a sufficient amt. of urea or formamide were added to make the octahedron the less sol. form. The measured

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difference between the value of C for various surfaces and that for the cube C_w are $C—C_w$ for octahedron 0.002, for face (310) 0.000, for face (320) —0.010, for the rhombicdodecahedron —0.010, for the face (212) 0.000, for face (321) —0.010, for face (211) —0.010. For a soln. with 15 g. formamide to 100 cc. water $C—C_w$ for the face (310) ±0.000, for the rhombicdodecahedron —0.020, for the face (212) —0.015, for the face (211) 0.010, for the face (321) —0.010, and for the octahedron —0.20. The force of crystn. depends upon the 3 factors, the solubility, the crystal structure, and the surface energy of the faces. E. S. LARSEN.

Pressure, even United with Time, Causes no Chemical Reaction. G. SPEZIA. Turin. *Rivista miner. crist. ital.*, 35, 62–4; *Z. Kryst. Min.*, 49, 208.—In 1898 S. found that the opal from Baldissero, when heated for 7 days at about 280–90° with a dil. soln. of Na silicate, inverted to quartz. However, a prism of the opal, left in a similar soln. under a pressure of 1,600 atms., at room temp. from July 13, 1898 to June 25, 1906, showed no quartz. The temp. did not rize above 30°. The surface of the opal was white but probably only from an infiltration of Na silicate. E. S. LARSEN.

Wulfenite from Rudnik, Azurite from Agua Caliente. E. HUNEK. Budapest. *Z. Kryst. Min.*, 49, 11–3. E. S. LARSEN.

A Comparison of Anhydride, Celestite, Barite and Anglesite as Regards the Change in their Geometric and Optic Constants with the Temperature. R. KOLB. Leipzig. *Z. Kryst. Min.*, 49, 14–61.—The axial ratios, indices of refraction, dispersion, dispersion of the optic axes (2E) and the axial angles (2E) of the above minerals are given for different temps. E. S. LARSEN.

Crystallographic-optic Studies. HEINRICH BAUMHAUER. Freiburg, Schweitz. *Z. Kryst. Min.*, 49, 113–32; cf. *C. A.*, 4, 1283.—Crystallographic and optic data are given for $Na_2Pt(CN)_4.3H_2O$, $SrPt(CN_4).5H_2O$, $Rb_2Pt(CN)_4.3H_2O(?)$, $Yt_2Pt_3(CN)_{12}.4H_2O$, and potassium and ammoniun picrates: $C_6H_2(NO_2)_3OK$ and $C_6H_2(NO_2)_3ONH_4$. E. S. LARSEN.

Diamonds, How and When they were Mede by Nature. R. B. CROCKER. *Chem. News*, 104, 248.—Facts are given supporting the theory that diamonds were formed before organic matter, when the earth's atmosphere consisted mostly of CO and CO_2, and the metallic elements were in a molten state. Molten Fe, solidifying in fissures and cavities filled with CO and CO_2, imprisoned them, and under the enormous pressure due to cooling and contracting, the O united with the Fe and the C crystallized as diamond. A. A. KLEIN.

The Garnet-bearing Inclusions in the Basalt of the Finkenburg, near Bonn. F. ZIRKEL. Bonn. *Centr. Min.*, 1911, 657–63.—The fragments of garnet-wollastonite-augite rock are believed to be basic segregations from the magma rather than inclusions of metamorphosed limestone, as claimed by Uhlig (*Verh. Naturw. Ver., Rheinl. Westfalen*, 67, 307–403). E. T. WHERRY.

Refining of Graphite. A. GAWALOWSKI. *Chem. Tech. Ztg.*, 29, 142.—Treatment of lime graphite with nascent HNO_3 and nascent HCl was tried, but no conclusive results were obtained. A mixt. of nascent HCl and HF gave a refined graphite containing 86% C. The crude graphite gave, before drying, C 13.90%, H_2O 26.82%, ash 59.28%; after drying, C 46.62%, H_2O 3.58%, ash 49.80%. In the reaction between H_2SO_4 and a mixt. of NaCl and CaF_2, and also a mixt. of NaCl and cryolite, a gas was obtained which did not seem to be a mixt. of HCl and HF. G. thinks this gas to be an acid of the comp. $H_6Cl_2F_4$ of $(H_2ClF_2)_2$. O. E. BRANSKY.

Lime Graphite. A. GAWALOWSKI. *Chem. Tech. Ztg.*, 29, 142.—A rich deposit of this graphite has been uncovered in south Moravia. It consists of 45% pure graphite, 40% $CaCO_3$, 10% Al and Fe silicates, besides silicic acid and small amts. of car-

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bonaceous matter which are decompd. by H_2SO_4. Treatment with HCl yields a refined graphite which, when still further treated with H_2SO_4, takes on an intense luster. Its structure is amorphous, since no scales are observed. It is suitable for graphite crucibles and C pencils, but not for lubricating purposes. The $CaCl_2$ soln., resulting from the treatment with HCl, is evapd.; the CO_2 is either used to make $NaHCO_3$, or is reduced to CO which serves as fuel in the evapn. of the $CaCl_2$ soln. For 100 kg. of raw graphite about 200 kg. of HCl are used, giving 100 kg. of fused $CaCl_2$, 17 kg. of CO_2, and 35 kg. of refined graphite. O. E. BRANSKY.

Hematite in Veins of Globe District. J. LANDERS. *Eng. Mining J.*, **92**, 1191–7.—The action of alkaline or metallic carbonates upon sulfide minerals, such as pyrite, may account for the occurrence of hematite in association with pyrite and chalcopyrite in the Summit mine in Arizona. ROBERT KANN.

Mineralogical Composition of some Oölitic Iron ores (Minettes). L. BLUM. Esch a./d. Alzette. *Stahl u. Eisen*, **31**, 922–4.—The compds. of 4 minettes from the Lothringia-Luxemburg region calc. on the basis of analyses are given. The first 3 were from Feutsch, the fourth from Esch. The compds. were as follows: Quartz and gang, 0.78, 0.48, 1.92, 1.09%; Al_2O_3, 8.32, 5.42, 5.39, 4.34%; MnO, 0.50, 0.47, 0.70, 0.57%; calcium phosphate, 6.24 4.30, 6.24, 4.78%; $CaCO_3$, 11.36, 2.12, 11.48, 4.23%; $MgCO_3$, 4.30, 2.26, 4.83, 6.64%; $FeCO_3$, 9.94, 10.33, 27.23, 34.80%; $FeSiO_3$, 31.99, 16.61, 25.74, 24.53%; magnetite, 20.05, 56.06, 12.19, 12.54%, respectively, for the 4 samples as numbered. The author believes the Al_2O_3 is not present as the silicate as is stated by Meunier (*Compt. rend.*, 1901, 1008). E. J. WITZEMANN.

The Principal Commercial Sources of Mica, Particularly those of the German Colonies. A. KLAUTZSCH. Berlin. *Elektrotechn. Z.*, **32**, 983–4.—A short account of the occurrence of mica in quantities suitable for mining. R. W. MOORE.

Existence of Organic Deposits in the Ferruginous Rocks Associated with the Huronian Iron Minerals of U. S. L. CAYEUX. *Compt. rend.*, **153**, 910–2.—Many of the Fe-bearing rocks are oölitic and preserve the most delicate organic structures admirably. Microscopic exams. showed organisms distinguished by 2 states of conservation. The fauna are represented by the Echinodermes, organisms which occupy a high position in the scale of invertebrates. A. A. KLEIN.

Internal or External Causes of the Deformation of Salt Beds. K. ANDREE. Marburg. *Centr. Min.*, 1911, 698–701.—In reply to Lachmann (*C. A.*, 6, 62) it is asserted that deformation of the type observed could not be due to chem. reactions.
E. T. WHERRY.

Notice of the Ash Fall from Mt. Aetna, September 10, 1911. E. DITTLER. Min. Inst., Univ. Vienna. *Centr. Min.*, 1911, 691–2.—A fresh sample showed glass, plagioclase, leucite and augite. E. T. W.

The Geology of the Lake Superior Region. C. R. VAN HISE AND C. K. LEITH. U. S.. Geological Survey. *Monograph*, **52**, 640 pp., maps.—The geological relations, the sep. mines and the origin of the ores are considered. Ores of pre-Cambrian sedimentary type constitute 99% of the productive ores of the region. In the simplest terms these consist of interbanded layers of iron oxide and SiO_2, in widely varying proportions, and their combinations, jaspilite, ferruginous chert, taconite or ferruginous slate. The rocks become ore by enrichment, leaching out of SiO_2 etc. As a whole they are considered to be altered parts of chemically deposited sedimentary formations. In lab. expts. it was found that silicic acid and $FeSO_4$ produce no ppt. but that water glass and $FeSO_4$ do produce a ppt. very similar in structure to greenalite. Also $FeCO_3$ is altered by silicic acid or alkaline silicate into silicate. Such reactions as are assumed to account for the origin of the ores seem to be capable of production

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in the lab. A large number of observations and speculations regarding these reactions and the field relations are given. R. C. WELLS.

Constitution of the Interior of the Earth as Determined by the Relation of the Displacement of the Once Reflected to the Direct Longitudinal Waves. LUDWIG GEIGER AND BENO GUTENBERG. Geophysik. Inst., Göttingen. *Physik. Z.*, 12, 814–8, 1008.—Previous measurements by Wiechert and Zöppritz on the velocity of earthquake waves indicated that the wave velocity increased steadily down to a depth of 1519 kilometers, but at greater depths was practically const. The authors now show that by combining the observations of Geiger on the amplitude relations of longitudinal earthquake waves with the velocity measurements of Wiechert and Zöppritz, the increase of velocity with depth can be proved to take place in 3 stages. The transition surfaces corresponding to these stages lie at 1194 ± 50, 1677 ± 100, and 2436 ± 150 kilometers, respectively, below the surface of the earth. L. H. ADAMS.

The Fizeau Method for Investigating the Interior of the Earth. H. LÖWY. Göttingen. *Physik. Z.*, 12, 1001–4.—A study of the conduction of elec. waves through rocks furnishes a means of investigating the interior of the earth, and also perhaps of locating ground-water and ore-beds. L. concludes from expts. along this line, and from the elec. properties of rocks, that in dry regions it should be possible to telegraph through the interior of the earth for great distances, and that the problem of the location of ground-water in very dry surroundings, *e. g.*, in deserts, by means of the reflexion of elec. waves is practically solved. L. H. ADAMS.

The Organic Origin of Petroleum (COSTE). 22. Radium Content of Rocks (BÜCHNER). 3. Basic Slag Phosphates (KROLL). 15. Universal Goniometer (HUTCHINSON). 1.

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9. METALLURGY AND METALLOGRAPHY.

WILLIAM BRADY, WILLIAM T. HALL.

Chilean Milling in Peru. B. L. LACKETT. *Eng. Mining J.*, 92, 943–5. ROBERT KANN.

The Effect of Phosphorus on the Composition and Appearance of the Ingot Metal Surface Containing it. ANON. *Brass World*, 7, 421–2.—The common error in the use of P is to add too much. In the case of mixts. containing Zn the amount should not be over 0.01 or 0.02%. An excess of P in such mixts. produces pin holes in the casting. P bronzes proper, consisting of Cu and Sn or Cu, Sn and Pb, can carry up to 1% P without endangering the casting. ROBERT KANN.

Squeezing Gold from Tailing Slimes. DENNIS H. STOVALL. *Mining Sci.*, 64, 517.—Tailings, slimes and sands enter a "montejus"—a huge steam boiler set on end below ground—from mills, are forced by compressed air with liquid into a special filter press, and squeezed through into cyanide tanks, Au being caught with Zn shavings. H. V. MAIN.

Efficiency of a Furnace. J. W. RICHARDS. *Mining Eng. World*, 35, 590. J. J. M.

Treatment of Low-grade Cinnabar Ores. C. A. MULHOLLAND. *Mining Eng. World*, 35, 241–2.—The extraction of Hg with shaft and muffle furnaces results in considerable loss, especially in working the poorest ores. A promising method which obviates this is described. After crushing, the finely divided HgS is dissolved with alk. sulfides containing free alk. hydrates, using at least 1 mol. of alk. sulfide and 1 of alk. hydrate

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to each mol. of HgS. After settling, this soln. is treated with $Zn(OH)_2$ in excess causing the pptn. of ZnS and HgS. The filtered sulfides are then heated with H_2SO_4 which dissolves ZnS and leaves a mixt. of HgS and Hg to be treated in the usual manner. H. M. PLUM.

Precipitation of Gold and Silver in Cyaniding. H. A. MEGRAW. *Mining Eng. World*, 35, 685–7.—The 3 general methods of pptn., involving the use of electricity, of charcoal, and of Zn, are discussed. The advantages of each method, the difficulties encountered and certain modifications of processes are mentioned. H. M. PLUM.

Electrolytic Oxygen in Cyanide Solutions. T. H. ALDRICH, JR. *Mining Eng. World*, 35, 791–2.—As Ag and Au are dissolved in the cyanide process only when the conditions are oxidizing, O is generally supplied by the medium of dissolved air in the soln. or chem. compds. which evolve it. In certain ores the reducing agents predominate and there is only partial extraction of the Au and Ag. This method supplies the O by the electrolysis of water in the soln.; expts. on ores, where all the Au could not be dissolved by air agitation, have given excellent results. Pb electrodes proved most satisfactory with the a. c. and were not consumed even where the ore pulp flowed over them. All kinds of ores have been treated with success and the av. cyanide consumption cut down from 1 lb. or more to as low as 0.23 lbs. per ton of ore treated. Batteries used in barren sump work equally as well as if inserted in the agitated pulp. H. M. PLUM.

The Parral Tank System of Slime Agitation. BERNARD MACDONALD. *Mining Eng. World*, 35, 847–9.—In the Parral tank, for transferring the pulp from the bottom of one tank to the top of another, 4 transfer pipes are used and operated by means of compressed air. On its delivery to the top end of the transfer pipe, the pulp is discharged so as to set up a spiral flow to the bottom of the tank. H. M. PLUM.

A Modified Form of the Pachuca Tank. J. F. BUELL. *Mining Eng. World*, 35, 958.—The modified form makes use of a movable air-lift by means of which the pulp can be put in suspension in a very short time. It complicates the construction and is recommended only where compact masses form in the settling of the pulp. H. M. PLUM.

Tonopah Process of Treatment of Sulfide Ores. W. J. STONEHAM. *Mining Eng. World*, 35, 1017–8.—This process operates economically and profitably on low-grade Au-Ag ores. In 2 mills the ore is converted to sands and slimes and both conc. before cyanide treatment. The Montana Tonopah mill slimes all the ore and then concentrates before cyaniding. In the Tonopah Extension conc. has been discontinued altogether, and the practice is sliming and cyaniding. This process is discussed. H. M. PLUM.

The Efficiency of a Lead Salt in Cyaniding. J. BURGGRAF. *Mining Eng. World*, 35, 1024.—In cyaniding a Ag ore, it is believed that the addition of a Pb salt could be entirely done away with in plants running for some time. The Na_2S formed in the reaction, $Ag_2S + 4NaCN = Na_2S + 2NaAg(CN)_2$, is taken care of by other factors and the addition of $Pb(OAc)_2$ or litharge to ppt. the Na_2S is not necessary to cause the regeneration of the cyanide. The cyanide soln. dissolves Zn while running through the pptg. boxes and the following reactions take place: $2AgNa(CN)_2 + Zn = Na_2Zn(CN)_4 + 2Ag$; $Na_2Zn(CN)_4 + Na_2S = 4NaCN + ZnS$. H. M. PLUM.

Smelting of Copper-bearing Magnetite. B. H. BENNETTS. *Mining Eng. World*, 35, 1162.—B. discusses how the Cu-bearing magnetite ores from the Mamie and Stevenstown mines in Alaska were treated. The magnetite ore would not reduce well on account of insufficient SiO_2 to make a smelting mixt. On increasing the SiO_2 content in the slag to 34%, the mat ran too high in Cu and there was loss of Cu in the slag.

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No sulfide ore being available, the SiO_2 content in the slag was reduced to 28% and the difficulties were overcome. H. M. PLUM.

Alloyed and Unalloyed Tool Steel. P. EYDAM. *Elektrochem. Z.*, 18, 226.—E. advizes against the indiscriminate use of expensive special steels and points out the conditions under which various tool steels should be selected. W. E. RUDER.

New Industrial Processes for the Case Hardening of Steel. F. GIOLITTI. *Engineering*, 92, 648–51; cf. *C. A.*, 5, 273, 274, 275, 3671.—A brief résumé of the fundamental facts brought out in previous papers, a bibliography of which is given. Drawings and description of G.'s vertical muffle cementation furnace are given with tables of properties of some of its products. L. W. SPRING.

Case Hardening by means of Compressed Gases. F. GIOLITTI AND F. CARNEVALI. *Engineering*, 92, 681–5; cf. *C. A.*, 5, 273, 274, 275.—With slight alteration in app. from that previously used, 6 distinct C and alloy steels were tested simultaneously in granular C and atm. of CO_2 under carefully regulated pressure. In case-hardening with more than a certain limit of CO_2 pressure, oxidation of the surface of the steel occurs which might in great degree be prevented by increasing the velocity of the CO_2 passing through the app. It was demonstrated theoretically and practically that the higher the temp. the wider become the limits of pressure within which case-hardening can be accomplished without surface oxidation. Alloys of Fe with metals less noble, as Cr and Mn, to avoid oxidation, require increasingly lower pressures as % of Cr or Mn increases, while those with nobler metals, as Ni, permit of higher pressures than Fe alone. This explains Charpy's observation (*C. A.*, 3, 1734) that CO_2 at 1000°, was decomposed by Cr steel filings, the Cr being oxidized and the Fe carburized. L. W. SPRING.

Mining and Ore Treatment at the Talisman Mine, Karangahake, N. Z. ARTHUR JARMAN. Australasian Inst. *Min. Eng.*, 3, 1–46 (1911).—The native Au found appears to be about 900 fine. The ore is quartzose, carrying streaks of Pb and Ag sulfides. Recovery by amalgamation = 30–40%. No amalgam traps are used, but each vanner has a Munz metal box inside of its distributing box. Concentrates average about 1.25% by wt., and 15–18% of the gross value of the ore which assays £85 per long ton. Bullion ratio, Au : Ag, varies from 1 : 3 to 1 : 30. Tailings from vanners are run to the cyanide vats. The plan of treatment is percolation, first with 0.85% ("medium") cyanide to which Na_2CO_3 has been added, then more medium soln. followed up by "strong" (1–1.5% cyanide). When the "strong" soln. begins to run off, the cock is closed and the air injector started. After 4 or 5 days' "contact" test samples of the pulp usually indicate a sufficient extraction, and the soln. is run off, followed by washes of "weak" (0.3% cyanide) soln. NaCN is chiefly used, though the ratings are in terms of KCN. Na_2CO_3 was found to be more efficient and satisfactory than CaO or NaOH. Expt. showed that the use of weak solns. was disadvantageous in extracting Ag. After settling, the CN solns. are run to the 6 Zn boxes, 3 of which are for weak soln., 1 for "medium" and 2 for "strong." For the slimes, the overflow from the sand vats is run through spitzkasten, some limewater being added to facilitate settling. 10 tons CaO are used to 750 tons of slime (dry wt.). After thickening, then agitating for 24 hrs. with air and 0.19–0.35% cyanide, butter filters are used. The slimes are dried, roasted and fused with 6% Na_2CO_3, 30 borax glass and 1 CaF_2, cast in conical molds, and again fused with a little borax, for casting into bars. The fineness is 52–146 in Au, and 50–60 of base metal. The crushed slags, worth about £30 per ton, are sent to the smelter. The bullion from amalgamation runs 357–535 fine in Au and contains 10–15 parts base metal. E. WALLER.

Slime Filtration. GEORGE J. YOUNG. *Bull. Am. Inst. Min. Eng.*, 59, 839-72;

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Mining Sci., 64, 551–4.—In slimes, 3 different substances are recognizable: Fine sand, a coagulated colloid and a colloid not coagulated. In ordinary milling the last has been eliminated by the use of CaO. The definition given is "a slime consists of a mixt. of sands finer than 150- or 200-mesh screen, with an amorphous clay-like material consisting principally of hydrated Al silicate." A grouping of the different appliances in use for filtration is given. To test a slime by the method used, mix 50 g. with 600 cc. H_2O in a beaker, let stand 2 min., pour into beaker No. 2. Add 600 cc. more H_2O and repeat. Meantime after No. 2 has been standing 2 min. decant into No. 3, and that again into No. 4. When each has been elutriated 4 times, decant No. 4 into one or more 1.5 liter beakers in the successive instalments. A 4-min. standing of the united wash waters followed by an 8-min. standing of the last decantation before pouring away, completes this part of the work. Drying, weighing up and making sieve tests on the sands deposited, and comparing their chem. analysis with that of the original slime, gives the complete data. E. WALLER.

Treatment of Nicaraguan Gold Ores. HENRY B. KAEDING. *Bull. Am. Inst. Min. Eng.*, 60, 1029–33.—Investigation of the ores of the PisPis district. The country rock is andesite, "porphyry" or dioritic rock, occasionally limestone and dacite. The gang is quartz which carries galena, chalcopyrite, pyrite, etc., at times sphalerite, magnetite, etc. Milling operations have hitherto been most wasteful, recovery by amalgamation having been 47%, by cyanide 10% more. By fine grinding, discarding amalgamation, and neutralizing by CaO, good results have been obtained, *viz.*, 90% extraction with a consumption of 2.9 lb. KCN and 4 lbs. CaO per ton of ore treated. E. WALLER.

Recovery of Gold-bearing Charcoal on Re-treating Filter-pressed Slimes. VICTOR T. EDQUIST. *J. Chamber Mines, W. Australia*, June, 1911, 152; through *J. Chem. Met. Soc., S. Africa*, 12, 102.—The slime, which contained about 0.2 oz. Au per t., had to be transported in trucks. As it was very sticky the trucks were dusted with wood ashes containing more or less charcoal, chips, juts, waste, etc. These were sepd. at the mill by passing the slimes through a trommel and then through a mixer. The above-mentioned materials so sepd. carried in the proportion of 20–40 oz. Au, the charcoal itself carrying about 100 oz. Au per t. A selective action seemed to have been exercized, as the bullion from the charcoal contained 3% Ag and considerable Hg, whereas the bullion from the entire slime contained 18% Ag. E. WALLER.

Zinc Dust as a Precipitant. M. THORNTON MURRAY. *J. Chem. Met. Soc. S. Africa*, 12, 109–10.—An exam. as to the surface exposed for action. In a sample submitted, 94.54% passed a sieve, the meshes of which permitted the passage of particles of 0.003 in diam. Microscopic measurements on the particles in this portion showed a mean diam. of 0.0085 in. and the av. diam. of the particles of the entire powder was calc. as 0.011506 in. The particles appeared to be spherical and bright, *i. e.*, no perceptible ZnO. Taking the d. of Zn as 6.92, 1 lb. of the powder would have a surface of 144.8 sq. ft. Allowing for the fact that the vendor guaranteed a content of 90% Zn, the surface exposed for action could be put at 130.32 sq. ft.—about 3 times as much as for the filiform Zn frequently used. E. WALLER.

Notes on the Treatment of Mill Concentrate. R. LINDSAY. *J. Chem. Met. Soc. S. Africa*, 12, 134–5.—Discussion—JAS. E. THOMAS describes the arrangement at the Simmer Deep-Jupiter reduction works. CaO is added to any material ground in amalgam barrels, to prevent formation of gases that might cause explosion on opening. By adapting the operation of a cone classifier to that of a tube mill, the coarser particles are constantly returned to the tube mill for re-grinding until they are brought to the condition for passing with the overflow. Compressed air is not available, and the cyaniding is conducted as usual in such a case. Eight t. charges are given 8 washes

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of 15 t. each of 0.07 KCN followed by 2 water washes of the same amt. The total time occupied by treatment is 8 days. The av. extraction is 97.1%. E. WALLER.

Efficiency in Ore Roasting. ARTHUR S. DWIGHT. *School Mines Quart.*, 33, 1–17.—The best gage of efficiency is the number of lbs. of ore treated per day, on a sq. ft. of the furnace hearth. The fineness or coarseness of the product is of considerable importance. Roasting methods may be classified thus, efficiency in lbs. being given in parentheses: (I) Heap or stall roasting (5–20); (II) reverberatory, (1) hand stirred (24–35), (2) mechanically stirred, (*a*) av. conditions (33–75), (*b*) special conditions (150), (3) revolving cylinders (128); (III) blast roasting in pots (up draft) (500–900, av. 600); (IV) blast roasting thin layers (down draft), (1) intermittent (1000–2000), (2) continuous (2200–3000). Special conditions for mechanically stirred roasters would occur with low S content, etc. At about this point comes into consideration the limits of the S that can be burned off without fusing the ore and thus interfering with the process. The practical limit appears to be at an efficiency of about 75 lbs. A step in advance was the blast roasting in pots where the ore was mixed with CaO or some other unoxidizable material to prevent such fusion, an air blast being driven through; the admixed material is chosen with a view to the formation of a sintered mass as a product. The initial S in such treatment should not be over 18%. The disadvantages in this method are that the upper layers remain in the condition of "fines," and the rest of the material comes out in masses too large to be utilized without mechanical crushing. This has been avoided by drawing the air *down* through the material, which is treated in comparatively thin layers (4 in.). The method was first applied intermittently, to sep. "pans" of ore where the cycle of operations of charging, igniting and discharging impaired the efficiency. The most recent improvement is the "continuous" system, in which "a thin layer of the ore is fed on a continuously moving conveyor, with grated bottom, traveling over an air tight box connected with an exhaust fan". E. WALLER.

Heat Treatment of a Nickel Steel. W. CAMPBELL AND H. B. ALLEN. *School Mines Quart.*, 33, 72–83.—The material used was an open-hearth steel containing Ni 3.15, C 0.27, Mn 0.65. Round $^{9}/_{8}$ in.; cold drawn. The points in the investigation were: 1. Critical points and refining temp. 2. Heating to various temp. from 600–1350° and cooling: in air; in furnace; by quenching in water; by quenching in oil. 3. Heating to temps. giving max. strength (900°) and quenching in water; quenching in oil and then drawing at 200° at 660° and cooling in air. The temp. of treatment, yielding point, ultimate strength, elongation and reduction in area, are recorded in the tables of results. The conclusions are: A steel of the above comp. may be refined by heating to 750°, which is about 75° lower than for ordinary steel. Hardening is complete on quenching at this temp. but a higher tensil strength resulted from quenching at about 900°. Over-heating is marked at above 1200°. Tempering of bars quenched in water or oil gives very uniform increases in ductility and decreases in strength, the change varying progressively with the temp. of reheating till at 650° the properties are very nearly those of the original steel. E. WALLER.

The Alloys of Cobalt and Zinc. F. DUCELLIEZ. *Bull. soc. chim.*, 9, 1017–23.—Alloys of Co-Zn were prepared by heating together the pure metals in H. $CoZn_4$ appears to be the only compd. formed in the series. Its existence was proved by a study of the solubility of the alloys in dil. HCl, by its representing the compd. of minimum magnetism, and by a study of e. m. f's. $CoZn_4$ is devoid of magnetism, and its $d_0 = 7.43$. It is oxidized rapidly by the air and is attacked by b. H_2O. Heated in in H the Zn is volatilized and magnetic Co left behind. At a dull red heat it is attacked by Cl with incandescence. At a red heat it burns in O. With liquid S its reaction is slow and there is little action when the compd. is heated in S vapors. Alkalies,

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alkaline carbonates and acetates react with it and the compd. will also dissolve in 10% solns. of $CoCl_2$, $CoSO_4$ or $Co(NO_3)_2$. Very dil. acids dissolve it slowly but with HCl and H_2SO_4 there is a tendency to leave behind some magnetic Co.

WILLIAM T. HALL.

Alloys. W. R. WHITNEY. *Chem. Eng.*, 14, 397–400; *Mining Eng. World*, 35, 643–4.—Attention is called to the possibilities in the way of useful discoveries with regard to alloys of little-used metals. WILLIAM T. HALL.

The Report of the Corrosion Committee of the British Association, 1911. J. NEWTON FRIEND. *Chem. News*, 104, 164–6.—Commenting upon the report of the association (*C. A.*, 6, 69) F. outlines the theory of the rusting of Fe under water and calls attention to the work of Diegel on the influence of various alloying elements upon the corrodibility of steel. W. T. H.

The Micrographic Examination of Failures. J. S. G. PRIMROSE. *Engineering*, 92, 748–51. W. T. HALL.

An Account of some Remarkable Steel Crystals, along with some Notes on the Crystallin Structure of Steel. E. F. LANGE. *Mem. Proc. Manchester Lit. Phil. Soc.*, 55, No. 24, 1–15.—The crystals were discovered in examining the pipe in a large rizing head which had been removed from a heavy steel propeller-boss casting. Such crystals have only been noted in conjunction with large castings, or ingots, and probably form during the slow descent of liquid from the upper to the interior portion of a mass of metal during the contraction caused by cooling. Chem. analysis indicated that there was considerable segregation in this case, in the area where the "pine-tree" growth occurred. WILLIAM T. HALL.

Damascus Steel. Its Structure and Properties. B. T. BELAEV. *Metallurgie*, 8, 699–704. W. T. HALL.

Determination of the Solubility Curve of Iron Carbide (Fe_3C) in Gamma Iron. N. J. WARK. *Metallurgie*, 8, 704–13.—The tests were made with 10 specimens forming a series between 1.21 and 1.96% C. The method used was to heat the samples to various temps., quench in H_2O and exam. microscopically. Specimens quenched below the satn. temp. showed traces of cementite while those quenched above the satn. temp. showed no cementite. Thus by quenching at temps. only a few degrees apart the satn. temp. for each specimen was detd. and a curve drawn. At 1130° 1.7% C satd. the Fe. Numerous tests showed that, in the vicinity of the satn. point curve, equil. was established between the solid soln. and the Fe_3C in about 10 min.

CARLE R. HAYWARD.

The Ternary System: Zinc-Lead-Tin. M. LEVI-MALVANO AND O. CECCARELLI. *Gazz. chim. ital.*, 41, II, 269–82.—The diagram for this system exhibits a gap in miscibility similar in form to that observed by Wright in liquid mixts. at 650° and 800° (*Proc. Roy. Soc. London*, 48, 25). While this gap occupies more than half of the field in which primary crystn. of the Zn takes place, it is comprized between relatively small temp. intervals (418–360°), while outside of this gap the surface falls to the ternary eutectic 177°. Several photomicrographs are reproduced.

CHAS. A. ROUILLER.

Constitution of Aluminium Brasses. M. LEVI-MALVANO AND M. MARANTONIO. Ist. chim. gen. r. univ. Roma. *Gazz. chim. ital.*, 41, II, 282–97.—Thermic and metallographic study of the binary system, Cu_3Al-Zn, and the ternary system, Cu-Cu_3Al-Zn. C. A. ROUILLER.

Constitution of Phosphorus Bronzes. M. LEVI-MALVANO AND F. S. OROFINO. Ist. chim. r. univ. Roma. *Gazz. chim. ital.*, 41, II, 297–314.—Thermic and photomicrographic study of the systems: Cu_3P–Cu_3Sn and Cu–Cu_3–P–Cu_3–Sn. C. A. R.

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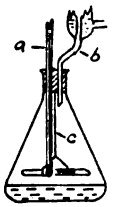
The Action of Oxygen on Metals. H. KÜHL. *Pharm. Zentralhalle*, 52, 863–6. —Maumené's contention concerning the existence of a series of intermediary Cu oxides, $Cu_2O \longrightarrow (x(Cu_2O)y(CuO)) \longrightarrow CuO$, is thought erroneous, such substances being regarded as mixts. of CuO + Cu. In the case of the differently colored ferric oxides, isomerism (inorganic) is assumed, so that $(Fe_2O_3)_x$ = yellow, $(Fe_2O_3)_y$ = brown, $(Fe_2O_3)_z$ = purple, etc. O does not act on the components of an alloy in the same manner; it acts on these individually. The action is on the surface. When such action extends deeper, it is possibly due to (1) the porous character of the metallic surface; (2) one of the metals may act as O cafrier; (3) the products of oxidation may be dissolved off (by NH_3), the O gaining a further access. A. VORISEK.

Some Metallographic Experiments. G. BAUMÉ AND E. WATSON. *Chem. Ztg.*, 34, 1101.—The authors describe a small cheap app. for detg. hardness of metals. It consists of a hammer constructed by Legris according to Brinell's principle. The polished sample is fastened to a massive cast-iron anvil. The hammer has a hardened steel ball on its lower surface, the height of the fall of which can be varied at will. The impression produced is measured micrometrically and calc. according to Brinell-Roos. E. J. WITZEMANN.

The Heat Treatment of Steels. H. HANEMANN. Metallograph. Lab., Kgl. Techn. Hochschule, Berlin. *Stahl u. Eisen*, 31, 1365–73.—An attempt was made to work out the exact relation between the heat treatment of steels and their mechanical properties. Six C-steels (with C from 0.99 to 1.56%, Mn 0.24 to —0.46%, Si 0.12 to 0.31%, P 0.020 to 0.031%, S trace) were used in the form of wire (5 mm. diam.). The app. for tempering at temps. from 100 to 357° is shown in the fig.: *a* is a thermometer, *b* a condenser, *c* a wire by which the stirup in which the sealed glass tube containing the sample to be tempered is suspended. The substances used were H_2O at 100°, naphthalene at 217°, azobenzene at 295°, and Hg at 357°. For temps. from 400 to 600° an elec. furnace was used. Curves and tables give the results in detail. In general, the results may be stated as follows: Hardened steel tends at all temps. below 695° to change α-Fe and free cementite. This transformation is imperceptible at ordinary temps.; at 650° it is complete in several hrs. The velocity of the transformation diminished at the time of tempering when the temp. is the same. At every tempering temp. there is a time of max. transformation velocity and a period following it of smaller transformation velocity. The time required for the transformation having the greatest velocity is about 3 hrs. at 100° and a few seconds at 650°. The change from martensite to pearlite at all temps. goes through an intermediate stage indicated by a max. mechanical strength and max. solubility in dil. H_2SO_4. When the change of martensite to α-Fe is equal at 2 different tempering temps. the size of crystals will be different and therefore the physical properties will be different, although chemically the constituents of the 2 are identical. E. J. WITZEMANN.



Flow of Heat through Furnace Walls (HERING). 2. Universal Metalloscope (SAUVEUR). 1. Apparatus for Metallography (HAYWARD). 1. Volatilization of Gold and Silver (KERN, HEIMROD). 7. Cyanide Solutions (ALDRICH). 4.

U. S., 1,011,203, Dec. 12. S. JAHN. **Pickling aluminium and its alloys.**

U. S., 1,011,255, Dec. 12. C. W. SHARTLE. **Pulp-reducing apparatus.**

U. S., 1,011,459, Dec. 12 H. S. MACKAY. **Extracting copper from ore.**

U. S., 1,011,524, Dec. 12. L. B. TEBBETTS. **Making composit metal plates.**

U. S., 1,011,562, Dec. 12. C. S. BRADLEY. **Concentrating copper values.**

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U. S., 1,011,897, Dec. 19. E. A. ASHCROFT. **Separating metals from zinc sulfide containing other metallic sulfides.**

U. S., 1,011,898, Dec. 19. *Idem.* **Recovering lead from lead sulfide containing other sulfides.**

U. S., 1,011,899, Dec. 19. *Idem.* **Treating sulfide ores.**

U. S., 1,011,900, Dec. 19. *Idem.* **Recovering zinc from a mixture containing zinc sulfide.**

U. S., 1,011,962, Dec. 19. P. C. C. ISHERWOOD. **Treating refractory zinc-lead ores.**

U. S., 1,012,151, Dec. 19. W. POLGLASE and F. BATES. **Apparatus for hydraulic separation of ore.**

U. S., 1,012,310, Dec. 19. F. A. WILMOT. **Manufacture of steel.**

U. S., 1,012,511, Dec. 19. H. BRANDENBURG. **Detinning tin scrap.**

U. S., 1,012,816, Dec. 26. F. L. CLERC. **Apparatus for reducing zinc oxide by carbon.**

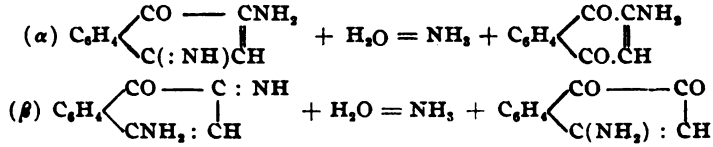
U. S., 1,012,871, Dec. 26. D. H. LENTZ. **Balling scrap metal.**

U. S., 1,012,872, Dec. 26. *Idem.* **Apparatus for balling scrap metal.**

10. ORGANIC CHEMISTRY.

J. BISHOP TINGLE.

Isomerism of Naphthoquinone Derivatives. O. MILLER. Lab. Prokhorov Manuf. Co., Moscow. *J. Russ. Phys. Chem. Soc.*, 42, 1418–46.—It was previously shown (*Ibid.*, 27) that diiminonaphthol (aminonaphthoquinoneimide) exists in two tautomeric forms which are hydrolyzed by H_2O to α- and β-aminonaphthoquinone:



The author finds that if a very dil. soln. (0.025%) of the HCl salt of diiminonaphthol be taken, the hydrolysis takes place at ordinary temp., and that in this case the reaction proceeds in two phases:

1. $C_{10}H_5N_3O.HCl.2H_2O \rightleftarrows C_{10}H_5N_3O + HCl + 2H_2O$
2. $C_{10}H_5N_3O + H_2O + HCl = NH_4Cl + C_{10}H_7N_3O$

The first reaction is reversible, the 2nd is not. Contrary to the statements of other authors (*Ann.*, 134, 397; 154, 312) the above HCl salt cryst. from alc. not anhydrous, but either with 2 or 0.5 mol. H_2O. The amt. of hydrolyzed product increases in arithmetrical progression as the conc. of the salt increases in geometrical progression. At ord. temp. the velocity of the formation is the same for both tautomers, while with rizing temp. the equil. is displaced in favor of the β-compd. H. M. GORDIN.

Bisulfite Compounds of Hydroxyazo Dyes. Preliminary Communication. N. N. VOROZHTZOV. *J. Russ. Phys. Chem. Soc.*, 43, 771–86.—According to Spiegel (*Ber.*, 18, 1479) and Bucherer (*C. A.*, 4, 1293), the compds. of $NaHSO_3$ with azo dyes are hydrazo derivs., X.NH.N(SO_3Na).Y. V.'s expts. show, however, that the NH_2 and Ac derivs. of azo dyes yield with $NaHSO_3$ compds. identical with those obtained from the dyes themselves, the NH_2 and the Ac being eliminated in the reaction,

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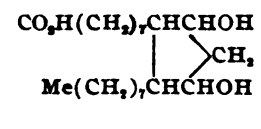
When these compds. are treated with alkali, they all yield the same hydroxyazo dyc. This shows that the OH group is essential for the reaction with $NaHSO_3$. Hence V. assumes that these compds. are azo esters of H_2SO_3, X.N : N.Y.O.SO_2Na, and that the reactions are as follows: R.N : N.R″.OH + $NaHSO_3$ = R.N : N.R″.O.SO_2Na + H_2O; R.N : N.R″.NH_2 + $NaHSO_3$ = R.N : N.R″.O.SO_2Na + NH_3; R.N : N.R″.O.Ac + $NaHSO_3$ = R.N : N.R″.O.SO_2Na + AcOH. *Sodium benzeneazo-α-naphthyl sulfite*, PhN : N—α—$C_{10}H_6$.O.SO_2Na (I), from $NaHSO_3$ and either benzeneazo-α-naphthol, acetylbenzeneazo-α-naphthylamine or benzeneazo-α-naphthol; dark-yellow needles, not affected by cold dil. acids, but is decomposed by weak alkali (Na_2CO_3, NH_3) giving benzeneazo-α-naphthol. By means of $BaCl_2$ (I) is changed to a *barium salt*, $C_{32}H_{22}N_4S_2O_6Ba$, microscopic needles. With $CuSO_4$ (I) gives an unstable *copper salt*. Salts of Fe‴, Hg″ and Sn″ were made, but not analyzed. *Sodium benzeneazo-β-naphthyl sulfite*, PhN : N—β—$C_{10}H_6$O.SO_2Na (II), from $NaHSO_3$ and either benzeneazo-β-naphthol, benzeneazo-β-naphthylamine or acetyl benzeneazo-β-naphthol; shining golden yellow needles; behaves with alkali like (I), giving the corresponding β-compd. *Barium salt*, yellow indistinct crystals; gives stable *copper salt*, $C_{32}H_{22}N_4S_2O_6Cu$, yellow needles or 6-sided plates; gives Fe‴, Hg″ and Sn″ salts (not analyzed). An attempt to get a definit compd. by acting with $NaHSO_3$ on benzeneazoresorcinol was not successful. Heated with NH_3 under pressure to higher temp. (I) gave a *substantive basic dye*, $C_{32}H_{28}N_8$, m. 280°, colors cotton and wool violet-red. A similar compd. seems to be formed from (II). H. M. Gordin.

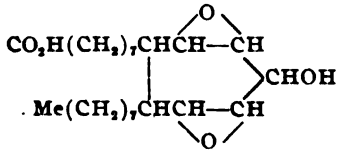
New Synthesis of o-Hydroxyazobenzene. N. N. Vorozhtzov. *J. Russ. Phys. Chem. Soc.*, **43**, 787–91.—Diazobenzene chloride is copulated with Ac-*p*-aminophenol, C_6H_4(OH)(NHAc), yielding *Ac-m-aminohydroxyazobenzene*, (OH)(NHAc)C_6H_3.N : NPh (yellow needles, m. 226°), the latter by saponification gives *m-amino-o-hydroxyazobenzene*, (OH)(NH_2)C_6H_3N : NPH (dark crystals m. 134–5°); *hydrochloride salt*, $C_{12}H_{11}N_3O$.HCl (m. 204–5°), and from this by diazotizing and then b. with alc. *o*-hydroxyazobenzene, HO.C_6H_4.N : NPh is obtained. H. M. Gordin.

α,α-Thiotolene Aldehyde. E. Grishkevich-Trokhimovskii. Org. Lab. Women's High School, Kiev. *J. Russ. Phys. Chem. Soc.*, **43**, 803–6.—Applying a previous reaction (*C. A.*, **6**, 223) to α,α-iodothiotolene (b_{10} 87–90°) *α,α-thiotolene aldehyde acetyl*, $C_{10}H_{18}SO_2$ (I), was made; colorless, thick liquid of a fruity odor, b_{747} 236.5–38°; $d_4^{19.5}$ 1.0388; $n_D^{19.5}$ 1.48953. B. dil. HCl changes (I) to *α,α-thiotolene aldehyde*, C_8H_6SO (II); colorless, strongly refracting liquid of a bitter almond odor, b_{749} 218–9.5°; d_{48}^{21} 1.1698; n_D^{21} 1.58166; *phenylhydrazone*, $C_{12}H_{12}SN_2$, bright yellow needles, m. 116–7°. By the action of NH_3 (II) was changed to the *hydramide*, $(C_8H_6S)_3N_2$; colorless, m. 124.5–5.5; is decomposed by warm. dil. acids into (II) and NH_3. H. M. Gordin.

Reaction of some Unsaturated Aliphatic Acids with Formaldehyde. S. Fokin. Novocherkassk. *J. Russ. Phys. Chem. Soc.*, **43**, 809–19.—By the action of CH_2O on oleic acid in presence of conc. H_2SO_4 at 50–60°, throwing the product into H_2O and extracting successively with petroleum ether and Et_2O, 3 fractions were obtained. The fraction insol. in petroleum ether and difficultly sol. in Et_2O is a *dihydroxy acid* (I);



(I)



(II)

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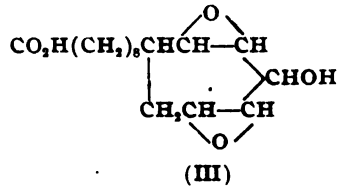
white cryst. m. 112–4°, solidifies 102–97°. *Barium salt*, $(C_{21}H_{39}O_4)_2Ba$; *sodium salt; silver salt; acetyl deriv.*, $C_{21}H_{38}O_4Ac_2$, sirupy liquid. The fraction sol. in petroleum ether contains an *acid* (II), thick liquid of a bitter taste; *acetyl deriv.*, $C_{23}H_{39}O_5Ac$. The fraction insol. in petroleum ether, but easily sol. in Et_2O, contains a *polymer* of the preceding acid, $(C_{22}NH_{40}O_5)_2$; thick liquid of a reddish yellow color and bitter taste; d_{20}^{20} 1.0171; gives a *sodium salt* and an *acetyl deriv.* Elaidic acid yielded the same 3 acids as oleic, while undecylenic acid gave only an *acid* (III), thick liquid. All these acids



(III)

(formolites) are indifferent to $ZnCl_2$ and halogen acids. H. M. GORDIN.

Polymerization of Diethylene Hydrocarbons. II. Polymerization and Isomerization of Unsymmetrical Dimethylallene. S. V. LEBEDEV. Univ. St. Petersburg. *J. Russ. Phys. Chem. Soc.*, 43, 820–34.—According to a private communication by Kucherov, unsym. dimethylallene (*a*), heated with quinoline-HBr, isomerizes to isoprene (*b*). The author finds that when (*a*) is heated alone in sealed tubes, only a small portion changes to (*b*), most of (*a*) polymerizing to *diisopropylidene-1,2-cyclobutane*, $CH_2 : C : CMe_2$ / $CH_2 . C : CMe_2$ (I) and *dimethyl - 1,1 - methylene - 2 - isopropylidene - 3 - cyclobutane*, $Me_2C—C : CH_2$ / $CH . C : CMe_2$ (II). (I) is a colorless liquid of an aromatic odor; b_9 61–2°; b_{753} 179–81°; d_4^{20} 0.8422; $n^{19.7}$; for D, C, F, and G, 1.50086, 1.50622, 1.51251 and 1.52345, resp. This shows an increment for MR_D of 2.32, showing high optical exaltation. In the air (I) is oxidized to a yellowish viscous liquid. With $NaNO_2$ it forms a cryst.

$CH_2 C : CMe_2$ / $CH_2.C : CMe_2$ (I) $Me_2C—C : CH_2$ / $CH_2C : CMe_2$ (II) $CH_2CHCHMe_2$ / $CH_2CHCHMe_2$ (III) CH_2CO / $CH_2C : CMe_2$ (IV)

compound m. 141°. By reduction (I) was changed to *diisopropyl-1,2-cyclobutane* (III); b_{760} 157–8.5°; d_4^0 0.7901; d_4^{20} 0.7755; n^{20} for D, C, F and G, 1.42787, 1.42565, 1.43316 and 1.43755, resp.; increment for MR_D 0.4. By more energetic reduction (I) seems to yield $C_{10}H_{22}$. When treated with O_3 it yields succinic anhydride, AcMe, acetone peroxide and *isopropylidene-2-cyclobutanone* (IV); almost colorless liquid of a quinone-like odor; b_{11} 57°; b_{760} 171°; d_4^{20} 0.9326; n^{20} for D, C, F and G, 1.48618, 1.48182, 1.49745 and 1.50571, respectively; increment for MR_D 1.86; absorbs O from the air; is oxidized by HNO_3 to $(CH_2CO_2H)_2$; gives an unstable *hydrazone* but a stable *semicarbazone*, $C_8H_{13}ON_3$, m. 241° (decomp.). Reduction changes (IV) to *isopropyl-2-cyclobutanone*, (V); b_{770} 148–50°, d_4^{20} 0.8704; n^{20} for D, C, F and G, 1.42827, 1.42595, 1.43376 and

CH_2CO / $CH_2CHCHMe_2$ (V) $Me_2C—CHMe$ / $CH_2CHCHMe_2$ (VI) $Me_2C—C : CH_2$ / CH_2CO (VII) $Me_2C—CO$ / $CH_2C : CMe_2$ (VIII)

1.43843, resp.; increment for MR_D 0.71; *semicarbazone*, m. 183°. (I) is a colorless liquid of a kerosene-like odor; b_9 37–9°; b_{753} 149–50°; d_4^0 0.8143; d_4^{20} 0.7982; n_{20} for

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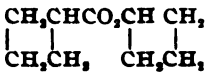
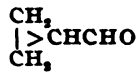
D, C, F and G, 1.46769, 1.46319, 1.47729 and 1.48623, resp.; increment for MR_D 2.09; gives cryst. *compound* with $NaNO_2$, m. 100° (decomp.). By reduction (I) yields *trimethyl-1,1,2-isopropyl-3-cyclobutane* (VI); b_{760} 145–6.5°; is unaffected by $KMnO_4$; d_4^0 0.7744; d_4^{20} 0.7598; n^{20} for D, C, F and G, 1.41997, 1.41781, 1.42527 and 1.42980, resp.; increment for MR_D 0.6. By the action of O_2 (II) yields *methylene-1-dimethyl-2,2-cyclobutanone-4* (VII), and *dimethyl-1,1-isopropylidene-3-cyclobutanone* (VIII). (VII) is an almost colorless liquid of a strong irritating odor; b_{50} 59–60°; d_4^0 0.8854; d_4^{20} 0.8684; n_{20} for D, C, F and G, 1.44654, 1.44378, 1.45481 and 1.46123, resp.; increment for MR_D 1.8; is oxidized by HNO_3 to dimethylsuccinic acid; exposed to the air it deposits cryst. m. 129° and exploding at higher temps.; gives *semicarbazones* m. 160–90° (decomp.). (VIII) is a liquid (not abs. pure) $b_{11.5}$ 58–65°; is unstable in the air.

H. M. Gordin.

Two Methods of Obtaining Cyclobutanol and some of its Transformations Accompanied by Isomerization. N. Ya. Demyanov and M. N. Doyarenko. Chem. Lab. Agr. Inst. Moscow. *J. Russ. Phys. Chem. Soc.*, 43, 835–46.—*Cyclobutyl tetramethylenecarboxylate* (I), was obtained by the action of I on Ag tetramethylenecarboxyl-



(I)

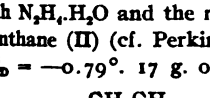


(II)

ate (cf. *Wien. Acad. Ber.*, 1892, 320; 1893, 59 and 734): $2C_4H_7CO_2Ag + I_2 = C_4H_7CO_2C_4H_7 + 2AgI + CO_2$; yield, 34.5%; b_{750} 198.5–99°; d_{15}^{15} 1.003; $d_{18.9}^{18.9}$ 1.0000; d_{23}^{23} 0.998; $n_D^{18.9}$ 1.4551. By sapon. (I) yields tetramethylenecarboxylic acid (*silver salt*, needles) and *cyclobutanol* (*a*) (the cyclobutanol obtained by all former authors never was pure); yield, 75%; b_{733} 122.5–23°; d_{15}^{15} 0.9226; $d_{15.9}^{18.9}$ 0.9206; d_{26}^{25} 0.9181; $n_D^{18.9}$ 1.4339; increment for MR_D 0.43; is oxidized by HNO_3 (1.36) to $(CH_2CO_2H)_2$. Another method of making (*a*) and (I) in one reaction consists in electrolyzing a soln. of K tetramethylenecarboxylate in presence of K_2CO_3 and $KHCO_3$. Oxidation of (*a*) with $CrO_3 + H_2SO_4$ gave a mixture of cyclobutanone and trimethylene aldehyde (II). By the action of HBr (*a*) yields a *bromide*, C_4H_7Br (*b*) b_{743} 105–6°, which seems to consist chiefly of *cyclobutyl bromide*. By treating (*b*) with Mg + CO_2 and decomp. of product with H_2SO_4 an *acid*, $C_5H_8O_2$ (*c*), b. 189–9;° was obtained which seemed to be different from the expected tetramethylenecarboxylic acid. (*b*) and (*c*) were also made by the same methods from cyclopropylcarbinol.

H. M. Gordin.

Catalytic Decomposition of Alkylidene Hydrazines. II. N. Kizhner. *J. Russ. Phys. Chem. Soc.*, 43, 951–62.—In a previous article (*C. A.*, 6, 347) the decomp. of alkylidene hydrazines of cyclic and bicyclic ketones was examd. The investigation is now extended to 2 unsatd. cyclic ketones, dihydrocarvone and carvenone, and 2 unsatd. fatty aldehydes, citronellal and citral. Dihydrocarvone (I) was treated with $N_2H_4.H_2O$ and the resulting hydrazone boiled with KOH. The product is $\Delta^{8,9}$-menthane (II) (cf. Perkin, *Chem. Zentr.*, 1905, II, 239); b_{750}°; d_0^{20} 0.8142; n_D 1.4523; $[\alpha]_D$ = —0.79°. 17 g. of (I) gave 8 g. of (II). By shaking with fuming HBr and



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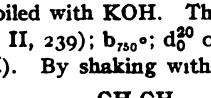

(II)

then splitting off the latter from the resulting bromide, $C_{10}H_{19}Br$, by distillation with $PhNH_2$ (II) is partly isomerized to $\Delta^{4,8}$-menthene (III) (cf. Wallach, *C. A.*, 2, 2083). Boiling dil. H_2SO_4 isomerizes (III) to Δ^3-menthene (IV), which was also obtained by warming the hydrazone of carvenone with KOH. By the same method the hydrazone of citronellal yields a *hydrocarbon*, $Me_2C : CH.(CH_2)_2.CH(Me).Et$ (*a*); b_{756} 164.5°;

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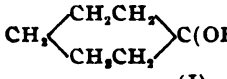
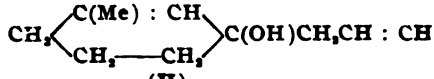
d_0^{20} 0.7533; n_D 1.14304; $[\alpha]_D$ 9.28°. Cold $KMnO_4$ oxidizes (*a*) first to a glycol, $Me_2C(OH).CH(OH).(CH_2)_3.CH(Me).Et$ (not isolated), and then to a *ketone alcohol*, $Me_2C(OH).CO.(CH_2)_3.CH(Me).Et$; b_{755} 218°; d_0^{20} 0.9069; n_D 1.4363; reduces hot NH_3 soln. of $AgNO_3$ in presence of alkali; is not colored by fuchsine-H_2SO_3; *semicarbazone*, rhombs or needles, m. 125–6° and has $[\alpha]_D$ 1.78° or 2.2° according to conc. (MeOH). Hot $KMnO_4$ oxidizes (*a*) to acetone and an *acid*, $CO_2H.(CH_2)_2CH(Me).Et$; b. 211–3°; d_4^{20} 0.9228; n_D 1.4198; $[\alpha]_D$ 8.85° (Et_2O); *silver salt*, needles. Fuming HBr changes (*a*) to a *bromide*, $C_{10}H_{21}Br$ (d_0^{20} 1.0772; n_D 1.4578) which upon distilling with $PhNH_2$ regenerates (*a*). Heated with HI (1.96) to 200° (*a*) was reduced to *2,6-dimethyloctane*, $Me_2CH.(CH_2)_3.CH(Me)Et$ (cf. Reformatskii and Markovnikov, *Ibid.*, 24, 679); b_{761} 159–9.5°; d_4^{20} 0.7313; n_D 1.411; $[\alpha]_D$ 1.75°. The same method applied to citral yielded an *isomer of dihydromyrcene*, $Me_2C : CH.(CH_2)_2.C(Me) : CHMe$ (cf. Semmler, *Die Aetherischen Oele*); b_{755} 164.5°; d_0^{20} 0.7674; n_D 1.4443; optically inactive. H. M. GORDIN.

Synthesis of Tertiary Methylxylyl and Hydroaromatic Allyl Alcohols. IPPOLIT MATZUREVICH. *J. Russ. Phys. Chem. Soc.*, 43, 973–90.—Yavorskii's method (*Ibid.*, 40, 782; *C. A.*, 3, 1019) was applied to the isomeric methyl xylyl ketones, cyclohexanone and several of its homologs. In all cases the yield of unsatd. tertiary alcs. is good. *4-Methylallyl-1,2-xylylcarbinol*, $1,2\text{-}Me_2C_6H_3(4)C(OH)(Me)CH_2CH : CH_2$, from 4-methyl-1,2-xylyl ketone; yield, 96.4–99.6%; colorless, rather thick liquid, $b_{19.5}$ 144–4.5°; $d_4^{21.5}$ 0.97258; $n_D^{21.5}$ 1.52752. *4-Methylallyl-1,3-xylylcarbinol*, $1,3\text{-}Me_2C_6H_3(4)C(OH)(Me)CH_2CH : CH_2$, from 1,3-dimethyl-4-acetylbenzene; colorless thick liquid of agreeable odor, $b_{14.5}$ 139–9.5°; $d_4^{21.5}$ 0.97675; $n_D^{21.5}$ 1.52882. *2-Methyl-1,4-xylylcarbinol*, $1,4\text{-}Me_2C_6H_3C(OH)(Me)CH_2CH : CH_2$, from 2-methyl-1,4-xylyl ketone; colorless liquid of agreeable odor, $b_{22.5}$ 138–9°; $d_4^{21.5}$ 0.97774; $n_D^{21.5}$ 1.52925. *Allylcyclohexanol* (I), from cyclohexanone; colorless, mobil liquid of a sharp, camphor-like odor;

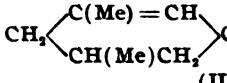


(I)



(II)

$b_{37.5}$ 95–7°; d_4^{22} 0.9341; n_D^{22} 1.47564. *1-Allyl-3-methylcyclohexenol* (II), from 3-methyl-Δ^2-cyclohexenone (b. 298–301); colorless, mobil liquid of camphor-peppermint odor becoming yellowish on standing; $b_{16.5}$ 99.5–100°; d_4^{22} 0.9551; n_D 1.49923. *1-Allyl-3,5-dimethylcyclohexenol* (III), from 3,5-dimethyl-Δ^2-cyclohexenone (b. 109–10.5°);



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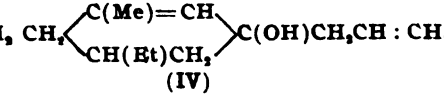
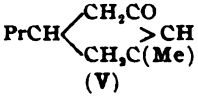


(IV)

yield, 95%; colorless, thick liquid of camphor-peppermint odor changing to white cryst. on standing or strong cooling; m. 28–31°; $b_{17.5}$ 108–8.5°. *1-Allyl-3-methyl-5-ethylcyclohexenol* (IV), from methylethylcyclohexenone, b_{755} 223–7° (cf. Wallach, *Ann.*, 323, 135); colorless, thick liquid of a peppermint-wax odor, $b_{12.5}$ 120–2°; d_4^{22} 0.91795; n_D 1.48731. *Ethyl propylidenebisacetoacetate* (*a*) was made by condensing Et acetoacetate with PrCHO in presence of a little Et_2NH. By b. with KOH (*a*) yields *3-methyl-5-*



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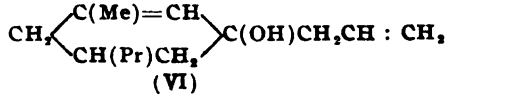

(VI)

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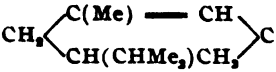
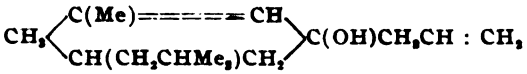
propyl-Δ^2*-cyclohexenone* (V); colorless, transparent, fatty liquid of agreeable odor, b. 242–4°; b_{37} 128–9°; $d_4^{22.5}$ 0.9267. By Yavorskii's method (V) was changed to *1-allyl-3-methyl-5-propylcyclohexenol* (VI); white stearin-like mass of a wax-peppermint odor, m. 34–7°; b_{20} 135–6°; $d_4^{22.5}$ 0.9225. *1-Allyl-3-methyl-5-isopropylcyclohexenol* (VII),



(VII)

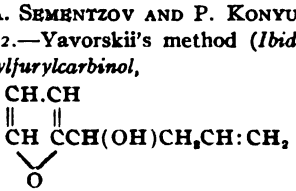
from 3-methyl-5-isopropyl-Δ^2-cyclohexenone (b. 240–5°); colorless, thick liquid of a wax-peppermint odor, $b_{20.5}$ 127–8°; solidifies to stearin-like mass on strong cooling, m. 26–9°; $d_4^{22.5}$ 0.9175; n_D 1.48905. *1-Allyl-3-methyl-5-isobutylcyclohexenol* (VIII), from



(VIII)

3-methyl-5-isobutyl-Δ^2-cyclohexenone; white stearin-like cryst. of a peculiar agreeable odor, m. 50–2.5°; b_{28} 140–2°. It will be noticed that with the growing complexity of the compds. the b. ps. rize, while the sp. gr. diminish and the tendency to crystallize increases. H. M. Gordin.

Action of a Mixture of Allyl Bromide and Furfuraldehyde on Magnesium. Synthesis of Allylfurylcarbinol. A. Sementzov and P. Konyukhov-Dobrinya. *J. Russ. Phys. Chem. Soc.*, 43, 990–2.—Yavorskii's method (*Ibid.*, 40, 785; *C. A.*, 3, 1019) applied to furfural gave *allylfurylcarbinol*,



Yield, 78%. The yield is not increased by working in an atm. of H. Colorless liquid, becoming yellow in 24 hrs. even in sealed vessel; b_{21} 96–7°; $d_4^{20.5}$ 1.0424; n_D 1.49192. H. M. Gordin.

Isolaurolene. I. Kondakov and I. Shindelmeizer. *J. Russ. Phys. Chem. Soc.*, 43, 992–1000.—NH_4 sulfocamphylate was recrystallized in presence of NH_3 (otherwise there is a loss of NH_3 with liberation of free acid) and subjected to dry distillation in presence of an excess of NH_4Cl (cf. *Ber.*, 20, 2959) in an atm. of CO_2. The oily distillates were optically inactive. The fraction b. 68–75° consisted chiefly of diisopropenyl, while that b. 108–10° contained isolaurolene, C_8H_{14}, some campholactones and camphophorone or some isomer of it. The residue of the NH_4 salt, distilled with steam, yielded *p*-xylic and *β*-hydroxyhexahydroxylic acids (cf. Perkin and Lees, *J. Chem. Soc.*, 79, 336). The mechanism of the formation of these compds. is supposed to be as follows: The sulfocamphylic acid first takes up and then gives off again HCl from the NH_4Cl, yielding *α*- and *β*-campholytic (lauronolic and isolauronolic) acids. These acids give among other lactones *ψ*-campholactone which changes to xylic and *β*-hydroxyhexahydroxylic acids, while the *α*-campholytic (lauronolic) changes to the *β*-acid (-isolauronolic acid) which, losing CO_2, gives isolaurolene. By a process of hydration and dehydration accompanied by an elimination of CO_2 and other groups, the hydroxy acids corresponding to *ψ*-campholactone yield diisopropenyl and camphophorone or its isomer. H. M. Gordin.

Oxidation of Caproic and Enanthylic Acids with Dilute Permanganate Solutions. E. S. Przhevalskii. *J. Russ. Phys. Chem. Soc.*, 43, 1000–6.—Slow oxidation of caproic acid with 1% $KMnO_4$ in neutral soln. gave $PrCO_2H$, $Bu(CO_2H).(CO_2H)_2$ and

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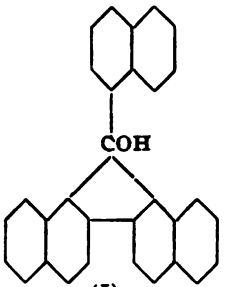
$(CH_2CO_2H)_2$, while enanthylic acid gave $(CO_2H)_2$, $(CH_2CO_2H)_2$, $EtCO_2H$, $PrCO_2H$, $BuCO_2H$ and 2 isomeric *ketone acids*, $C_7H_{12}O_3$. The latter were obtained only as *semicarbazones* m. one 138–40°, the other 176°. H. M. GORDIN.

Investigation of Trinaphthylmethane Compounds. A. E. CHICHIBABIN. *J. Russ. Phys. Chem. Soc.*, 43, 1022–39.—A reëxam. of Schmidlin and Massini's trinaphthylcarbinol (*C. A.*, 3, 2558) and of its reduction product previously described by the C. as trinaphthylmethane (*C. A.*, 5, 2833) showed that the latter contains 2 ats. H less than was supposed, having the formula (II) of α-naphthyldi-α,α-naphthofluorene. As to the carbinol of S. and M., many of their statements about it are incorrect. As made by their method, *i. e.*, in presence of air and moisture, it quickly absorbs O from the air (a fact entirely overlooked by them) and changes to a stable compd. of the formula (I) of α-naphthyldi-α,α-naphthofluoryl alc.: $C_{21}H_{22}O + O_2 = C_{21}H_{20}O + H_2O_2$. Both the absorption of O and the formation of H_2O_2 were proved experimentally. The same oxidation of *α,α,α-trinaphthylcarbinol*, $(C_{10}H_7)_3C.OH$ (*a*), to (I) can be



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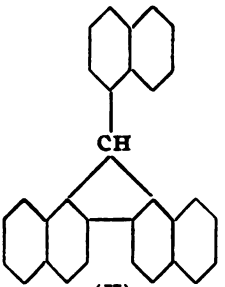

(II)

accomplished with $KMnO_4$. C. made the *unstable* (*a*) not by the method of S. and M., but by the action of Mg-α-naphthyl chloride in an atm. of CO_2 on α,α-dinaphthyl ketone obtained by oxidation of α,α-dinaphthylcarbinol (Schmidlin and Massini, *C. A.*, 3, 2557; Chichibabin, *C. A.*, 5, 1761) and dried it at 60° in a current of CO_2. (*a*) combines with Et_2O and C_6H_6. The Et_2O compd., recrystallized from AcOEt, m. 140–60°. From the C_6H_6 compd. the C_6H_6 can be removed by heating in H to 160°. Dry and in absence of air (*a*) is perfectly stable. Neither (I) nor (*a*) give the Chugaev-Tzerevitinov reaction for OH. HBr changes (I) to a *yellow bromide*, $C_{21}H_{19}Br$, m. 215–8° (decomp.), while (*a*) under the same conditions gives a *white bromide*, $(C_{10}H_7)_3CBr$, needles, m. 178° (decomp.). By reduction the yellow bromide changes to (II). HI changes (*a*) to an *iodide*, $(C_{10}H_7)_3CI$, white needles, m. 159°. (II) can be obtained almost colorless by repeated recrystn. from C_6H_6. The yellow bromide dissolves in H_2SO_4 with a blue color, while (*a*) gives an orange-red soln. which, when heated, assumes the same color as that of the bromide. The colors may be due either to a quinoid structure of the compd. in soln. or to the formation of oxonium salts. H. M. GORDIN.

Rearrangement in the Quinine Group. BÖRNSTEIN. Berlin. *Chem. Ztg.*, 34, 1023.—On treating *p*-toluidine with PbO_2 the *compound* $(C_7H_7N)_4$ is obtained, which, when treated with dil. alc. H_2SO_4, loses a toluidine mol. and forms a *quinonimine*. When crystallized from H_2SO_4 soln. this compound undergoes a rearrangement involving the CO groups. E. J. WITZEMANN.

Bromination of Phenol. J. G. DINWIDDIE AND J. H. KASTLE. Univ. of Virginia. *Am. Chem. J.*, 46, 502–8.—Excess of Br was added to a soln. of PhOH in glacial AcOH in $CHCl_3$, in CCl_4 and in CS_2 and the amt. of Br remaining detd. The compds. formed were either dibromophenol or a mixt. of mono- and tribromophenol. Dibromophenol

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was prepared from PhOH with required amt. of Br; white solid, m. 34°. It was probably 2,4-dibromophenol. In organic solvents Br acts on PhOH as upon other aromatic substances, the change being one of substitution. T. E. LAYNG.

Study of *o*-Amino-*p*-sulfobenzoic Acid and its Derivatives, with Special Reference to their Fluorescence. J. H. KASTLE AND R. D. HADEN. Univ. Virginia. *Am. Chem. J.*, 46, 508–18.—*Triethyl-o-amino-p-sulfobenzoate*, $EtNHC_6H_3(CO_2Et)SO_2Et$, was obtained from EtI and di-Ag salt; fine, needle-shaped yellow crystals from H_2O + alc., m. 151–3°. *Monosilver o-amino-p-sulfobenzoate*, from the acid and the di-Ag salt. With excess of EtI it gives large yellow crystals of the tri-ester identical with that obtained from the di-Ag salt, m. 150–3°. From the mother liquor white crystals of the original acid sepd. showing that the acid Ag salt is $[NH_2C_6H_3(CO_2H)SO_3H + NH_2C_6H_3(CO_2Ag)SO_3Ag.2H_2O]$. A comparison was made of the fluorescence of the parent amino acid with the *N* rhombic ester and the yellow tri-ester in various solvents. The tri-ester exhibits its fluorescence in greatest number of solvents, the tint being always blue. Fluorescence of aminoterephthalic acid is apparently analogous to that of *o*-amino-*p*-sulfobenzoic acid. T. E. LAYNG.

The Synthesis of Fumaric and Malic Acids from the Acetylene Diiodides. E. H. KEISER AND L. MCMASTER. Washington Univ. *Am. Chem. J.*, 46, 518–23.—The work of Keiser upon the synthesis of fumaric acid from solid acetylene diiodide was repeated and confirmed and the liquid acetylene diiodide was transformed into maleic acid, showing that the solid diiodide m. 73° was the *trans* or fumaric form and the liquid diiodide b. 185° was the *cis* or maleic form.

HCI	HCI
‖	‖
ICH	HCI
m. 73°	b. 185°.

T. E. LAYNG.

The Nitrile of Fumaric Acid. E. H. KEISER AND J. J. KESSLER. Washington Univ. *Am. Chem. J.*, 46, 523–8.—Fumaramide was prepared either by treating di-Et bromosuccinate or di-Me fumarate with NH_3. The specimens obtained were identical and when each was heated with P_4O_{10} *fumaric nitrile*, $C_2H_2(CN)_2$ sublimated in needle-like crystals m. 96°, b. 186°. Unsuccessful attempts were made to hydrolyze the nitrile with dil. H_2SO_4 and to prepare maleic nitrile from NH_4 maleate and P_4O_{10}. T. E. LAYNG.

Chloraloxime. F. C. PALAZZO AND F. FAZIO. *7th Intern. Congr. Appl. Chem.*, 1909, 244–6; *J. Chem. Soc.*, 100, I, 421. E. J. C.

The Constitution of the Hydroxamic Acids. F. C. PALAZZO. *7th Intern. Congr. Appl. Chem.*, 1909, 249–52; *J. Chem. Soc.*, 100, I, 428. E. J. C.

Oxalomonohydroxamic Acid. F. C. PALAZZO AND E. OLIVERI-MANDALA. *7th Intern. Congr. Appl. Chem.*, 1909, 247–8; *J. Chem. Soc.*, 100, I, 428. E. J. C.

Some Hydroxamic Acids of the Pyrone Series. E. OLIVERI-MANDALA. *7th Intern. Congr. Appl. Chem.*, 1909, 303–4; *J. Chem. Soc.*, 100, I, 428. E. J. C.

The Existence of other Gaseous Compounds of Carbon and Nitrogen besides Cyanogen. A. P. LIDOV. *7th Intern. Congr. Appl. Chem.*, 1909, 315; *J. Chem. Soc.*, 100, I, 429. E. J. C.

The Influence of the Constitution and Structure of Organic Acids on the Stability of their Carboxyl Group. P. N. RAIKOV AND P. TISHKOV. *7th Intern. Congr. Appl. Chem.*, 1909, 91–6; *J. Chem. Soc.*, 100, I, 445. E. J. C.

The Tautomerism of Isatin. F. C. PALAZZO AND G. SCELSI. *7th Intern. Congr. Appl. Chem.*, 1909, 243–4; *J. Chem. Soc.*, 100, I, 486. E. J. C.

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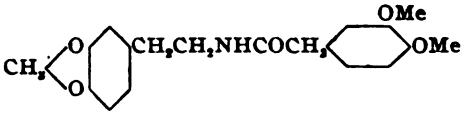
Diazoammino and Aminoazo Derivatives Obtained from Aminomethylenedioxybenzene. E. MAMELI. *7th Intern. Congr. Appl. Chem.*, 1909, 101–7; *J. Chem. Soc.*, 100, I, 510. E. J. C.

Advances in Chlorophyll Chemistry. E. W. MAYER. *Chem. Ztg.*, 35, 1341–3, 1354–6, 1364–5. J. J. M.

Synthesis of Berberine. AMÉ PICTET AND ALFONS GAMS. Org. Lab., Univ. Geneva. *Ber.*, 44, 2480–5; see *C. A.*, 5, 3413.—Homoveratroylhomopiperonylamine, (I) is prepared by treating homoveratrumic acid with PCl_5 and $CHCl_3$; after removing



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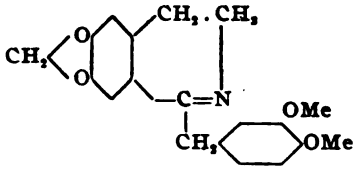
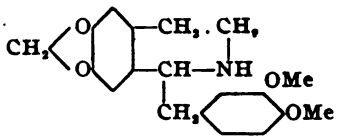


(II)

$POCl_3$ under reduced pressure the product is shaken with aq. homopiperonylamine hydrochloride and KOH. Yield, 150% of the acid. When b. with xylene and P_4O_{10} it is converted into *1-veratryl-6,7-methylenedioxy-3,4-dihydroisoquinoline* (II); amorphous, m. 68–70°. Yield, 33% of the amine. *Hydrochloride*, white, amorphous powder, m. 148–51° (decomp.). Comparison of (II) with nandinine shows that they are not identical. Veratrylnorhydrohydrastinine (III) has an extremely bitter taste and



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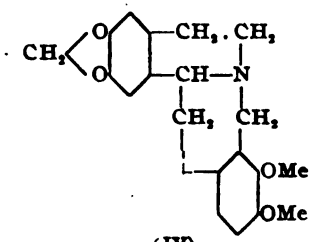

(IV)

gives with conc. H_2SO_4, or with Fröhde's reagent, a brown color which soon changes to violet. With Mandelin's reagent the color is lilac, changing successively to purple, brown and brownish yellow. *Hydrochloride*, small, colorless prisms from Et_2O + alc., decomp. 250°. *Nitrosoamine*, solid; it gives Liebermann's reaction. *Picrate*, yellow, cryst. powder. *Chloroplatinate*, yellow, cryst. powder. *Dichromate*, small red needles. Tetrahydroberberine (IV) is formed by warming (III) with conc. HCl and HCHO, on the H_2O bath. It was fully identified. Yield, 35% of (III). It was converted into berberine by the action of Br, in CS_2, or of dil. HNO_3. J. BISHOP TINGLE.

1,10-Diphenyldecane and a Method for the Preparation of ω,ω'-Diarylated Aliphatic Hydrocarbons. W. BORSCHE AND J. WOLLEMANN. Gen. Chem. Inst., Univ. Göttingen. *Ber.*, 44, 3185–8.—Sebacyl chloride is best prepared from the acid and PCl_5. With C_6H_6 and $AlCl_3$ it gives ω-benzoylnonylic acid (m. 85–6°) and diphenyldiketodecane, $BzCH_2(CK_2)_6CH_2Bz$; pale yellow plates from alc., m. 91–2°. Yield, 80% of the chloride. *Dioxime*, pale yellow crystals from dil. alc., m. 120–1°. It is reduced by Na and abs. alc. to *1,10-diphenyl-1,10-diaminodecane*; colorless, viscid oil with a characteristic, basic odor, b_{18} 260°. *Dibenzoyl derivative*, white powder from glacial AcOH, m. 198–9°. *Dicarbamino derivative*, small, white, microscopic needles, m. 183–4°. 1,10-Diphenyl-$\Delta^{1,9}$-decadiene, $PhCH : CHCH_2(CH_2)_4CH_2CH : CHPh$, is prepared by distilling the amine phosphate, under reduced pressure; long needles from

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alc., or glacial AcOH, m. 53°. *Tetrabromo derivative*, white, cryst. powder from alc., m. 164–5°. *1,10-Diphenyl-1,10-dihydroxydecane*, $C_{22}H_{30}O_2$, from the ketone, Na and alc.; white, interlaced needles from ligroin, m. 70–2°. It gives a poor yield of the above decadiene when distilled with $ZnCl_2$. *1,10-Diphenyldecane* is formed from the decadiene, H and colloidal Pd; white crystals, m. 16–7°; b_{12} 234°. When liquid it is highly refractive. J. Bishop Tingle.

Spectrochemistry of Subsidiary Valences. Fritz Eisenlohr. Chem. Inst., Univ. Greifswald. *Ber.*, 44, 3188–208.—Study of refractive and dispersion consts. leads E. to the following conclusions: Elements which exhibit varied valency may show optical exaltation if they occupy a conjugated position relative to the double linkage. This variation in optical power is ascribed to the subsidiary valencies, the effect of which varies according to the linkages in question. This is supposed to explain the different optical values of such elements as O in ethers and in OH compds., or of N in primary, secondary and tertiary amines. Exaltation is ascribed to the unsatd. character of the subsidiary valencies; it is diminished if the conjugation is disturbed, and the disturbance may be sufficiently great to produce optical depression. Crossed conjugations, in which the subsidiary valencies participate, exhibit a marked diminution in the exaltation. In this respect they differ from simple conjugated double linkages. Optical depression is not limited to aromatic-heterocyclic systems, but is shown in the case of acyclic and of alicyclic compds. The optical effect of the subsidiary valencies of an unsatd. at. is usually far more strongly marked in the case of the refraction than in that of the dispersion. The following new values are recorded: PhOH, b_{20} 91.4°; $d_4^{40.6}$ 1.0596; n_α 1.53691; n_D 1.54247; n_β 1.55581; n_γ 1.56840 at 40.6°. Thiophenol, b_{20} 77°; $d_4^{23.2}$ 1.0739; n_α 1.57971; n_D 1.55613; n_β 1.60285; n_γ 1.61685, at 23.2°. Et β-aminocrotonate, $b_{14.5}$ 105.4–7.0°; $d_4^{18.8}$ 1.0219; n_α 1.49479; n_D 1.50067; n_β 1.51647; n_γ 1.53160, at 18.8°. Et α-ethyl-β-aminocrotonate, m. 59–60°; $d_4^{65.2}$ 0.9526; n_α 1.47040; n_D 1.47557; n_β 1.48909, at 65.2°. Me α-chlorocrotonate, b_{762} 161.5–7°; $d_4^{22.6}$ 1.1587; n_α 1.45302; n_D 1.45634; n_β 1.46477; n_γ 1.47187, at 22.6°. Et α-chlorocrotonate, b. 175–5.5°; $d_4^{19.8}$ 1.1133; n_α 1.45065; n_D 1.45378; n_β 1.46174; n_γ 1.46852, at 19.8°. Et β-chloroisocrotonate, b. 159.61°; $d_4^{18.7}$ 1.0924; n_α 1.45065; n_D 1.45423; n_β 1.46308; n_γ 1.47065, at 18.7°. J. B. T.

Products of the Dry Distillation of Calcium Pinate. W. Bonsdorff. Chem. Lab., Trade Hochsch. Finland. *Ber.*, 44, 3208–10.—Distillation of a mixt. of pinic acid and $Ca(OH)_2$ gave an oil which was steam distilled and then fractionated. The portion b_8 50–100° contained a compd., probably *1-isopropylene-2-ketopentamethylene*, $Me_2C : C<\begin{matrix}CO—CH_2\\ |\\ CH_2.CH_2\end{matrix}$, which was sepd. with semicarbazine; water-clear liquid, b_8 69–71°; d_4^{20} 0.9355; n_α 1.46359; n_D 1.46660; n_β 1.47383; n_γ 1.47994, at 20°; mol. ref. 36.788; $M_\beta - M_\alpha$ 0.694; $M_\gamma - M_\alpha$ 1.104. *Semicarbazone*, white scales from MeOH, m. 159–61°. Yield, of crude ketone, 60% of the total distillate; of the semicarbazone 30% of the crude ketone. J. Bishop Tingle.

Action of Acid Chlorides on Ethyl Diethoxyacetate. B. Mylo. Org. Chem. Lab., Techn. Hochsch., Danzig. *Ber.*, 44, 3211–5.—At 80–140°, PCl_5 converts Et diethoxyacetate into *ethyl ethoxychloroacetate*, $EtOCHClCO_2Et$; liquid, b_{12} 79°. Yield, 94.5%. At 80°, with Cu powder it gives di-Et diethoxysuccinate, $EtO_2CCH(OEt)CH(OEt)CO_2Et$. *Acid*, sirup. *Silver salt*, colorless and cryst. *Ethyl ethoxybromoacetate*, from Et diethoxyacetate and AcBr; liquid, b_{11} 90–1.5°. Yield, 81%. With Cu it reacts like the Cl compd. In presence of a little $ZnCl_2$, BzCl reacts with the diethoxy ester, but the $ZnCl_2$ causes much secondary decomp. J. Bishop Tingle.

Studies in the Coumarone Group. J. Tambor. Univ. Lab., Bern. *Ber.*, 44,

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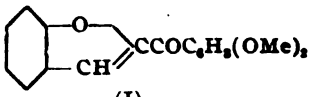
3215–23.—The following methods are available for the prep. of the alkyl ethers of oxy-1-benzoylcoumarone: 1. From alc. KOH and *o*-acetoxychalkone dibromide; 2. from coumarilyl chloride, $AlCl_3$ and phenol ethers; 3. from salicylic aldehyde, α-bromoacetophenone and alc. alkali. 2′,5′-Dimethoxy-1-benzoylcoumarone is formed by each of the 3 methods. *2-Hydroxy-2′,5′-dimethoxychalkone*, $HOC_6H_4CH : CHCOC_6H_3(OMe)_2$, from 2,5-dimethoxyquinacetophenone and salicylic aldehyde; orange prisms from alc., m. 119.5°. In conc. H_2SO_4 the color is orange. *Acetyl derivative*, oily. *2,5-Dimethoxy-1-benzoylcoumarone*, formula (I) below; yellow plates from alc., m.



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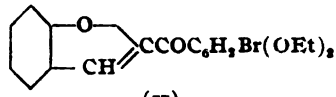
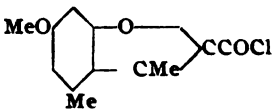


(II)

98°. With conc. H_2SO_4 it becomes red and gives an orange-colored soln. *2,5-Dimethoxy-α-bromoquinacetophenone*, $(MeO)_2C_6H_3COCH_2Br$, from hydroquinyl dimethyl ether, bromoacetyl bromide and $AlCl_3$; colorless needles from alc., m. 91°. Resorcinyl diethyl ether, coumaryl chloride and $AlCl_3$ give *2′,4′-diethoxy-1-benzoylcoumarone* (see I); almost colorless prisms from alc., m. 87°. Conc. H_2SO_4 colors them orange, the soln. is yellow. *2-Hydroxy-2′,4′-diethoxychalkone*, $HOC_6H_4CH : CHCOC_6H_2(OEt)_2$, prepared like the homolog; greenish yellow prisms from dil. alc., S-yellow needles from conc. alc., m. 164° (gas evolution). It becomes orange with conc. H_2SO_4, the soln. being yellow. *Acetyl derivative*, small, colorless needles from dil. alc., m. 69°. *2-Hydroxybenzal-bis-2′,4′-diethoxyacetophenone*, $HOC_6H_4CH[CH_2COC_6H_3(OEt)_2]_2$, is formed, together with the preceding chalkone from salicylic aldehyde, diethoxyresacetophenone and conc. aq. NaOH; greenish yellow needles from alc., m. 73°. In conc. H_2SO_4 the color is pale yellow. *2-Acetoxy-2′,4′-diethoxy-5′-bromochalkone dibromide*, colorless prisms from alc., m. 139°. Alc. KOH converts it into *2′,4′-diethoxy-5′-bromo-1-benzoylcoumarone* (II); colorless prisms from alc., m. 143°. It becomes orange-colored with conc. H_2SO_4. It is also formed from 2′,4′-diethoxy-1-benzoylcoumarone and Br. Its constitution is shown by the following facts. *2′,4′-Diethoxy-2-hydroxy-5-bromochalkone*, $HOC_6H_2BrCH : CHCOC_6H_2(OEt)_2$, from diethoxyresacetophenone and 5-bromosalicylic aldehyde; pale yellow, lustrous needles from alc., m. 175° (decomp.). *Acetyl derivative*, lustrous, pale yellow needles, m. 112°. *2-Acetoxy-2′,4′-diethoxy-5-bromochalkone dibromide*, colorless, rhombohedral crystals from alc., m. 147°. *2′,4′-Diethoxy-5-bromo-1-benzoylcoumarone*, colorless, rhombohedral crystals from alc., m. 126°. In conc. H_2SO_4 the color is orange. *5-Methoxy-2,3-dimethylcoumaryl chloride* (III), from the acid and PCl_5; pale green needles from C_6H_6, m. 137°. With anisole and



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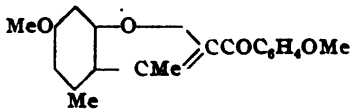

(IV)

$AlCl_3$ it gives *2,3-dimethyl-5,4′-dimethoxy-1-benzoylcoumarone* (IV); white, lustrous needles from alc., m. 145°. In conc. H_2SO_4 the color is orange. *2,3-Dimethyl-5,3′4′-trimethoxy-1-benzoylcoumarone* from (III), veratrole and $AlCl_3$; slender, white, lustrous needles from alc., m. 156°. In conc. H_2SO_4 the color is orange-red. *2,3-Dimethyl-5,2′,4′-trimethoxy-1-benzoylcoumarone*, from resorcinyl dimethyl ether, like the preceding compd.; yellow needles from alc., m. 115°. In conc. H_2SO_4 the color is orange-red. The following compds. were made from (III) and the resp. ethers mentioned. *2,3-Dimethyl-5,2′,5′-trimethoxy-1-benzoylcoumarone*, from hydroquinyl dimethyl ether; yellow, cubical prisms from alc., m. 135°. In conc. H_2SO_4 the color is orange-red. *2,3-Dimethyl-5,2′,4′,6′-tetramethoxy-1-benzoylcoumarone*, from phloroglucinyl trimethyl

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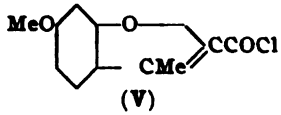
ether; pale yellow, prismatic rods from alc., m. 196–7°. In conc. H_2SO_4 the color is orange-yellow. *2,3-Dimethyl-5,2',3',4'-tetramethoxy-1-benzoylcoumarone*, from pyrogallyl trimethyl ether; slender yellow needles from alc., m. 158°. In conc. H_2SO_4 the color is orange-red. Yield, poor. *5-Methoxy-2-methylcoumaryl chloride* (V), pre-



(V)

pared like (III); greenish needles from C_6H_6 or Et_2O, m. 104–5°. It gives the compds. described below with the resp. ethers mentioned. *5,4'-Dimethoxy-2-methyl-1-benzoylcoumarone*, from anisole; pale yellow plates from alc., m. 140°. *5,3',4'-Trimethoxy-2-methyl-1-benzoylcoumarone*, from veratrole; small, colorless plates from alc., m. 153–4°. *5,2',4',6'-Tetramethoxy-2-methyl-1-benzoylcoumarone*, from phloroglucinyl trimethyl ether; small, microscopic, dark yellow plates from dil. alc., m. 178°. *5,2',3',4'-Tetramethoxy-2-methyl-1-benzoylcoumarone*, from pyrogallyl trimethyl ether; pale yellow needles from dil. alc., m. 72–3°. With conc. H_2SO_4 the preceding 4 compds. become red, in soln. orange-colored. J. Bishop Tingle.

Propenylbenzene from Cinnamylammonium Salts. Hermann Emde. Chem. Inst., Univ. Strassburg. *Ber.*, 44, 3224–6.—The propenylbenzene, PhCH : CHMe, prepared from cinnamylammonium salts (*C. A.*, 3, 2569) when treated with O_2 gives BzH, but no phenylacetaldehyde, or phenylacetic acid. This shows that the propenylbenzene is free from allylbenzene and also, probably, from propylbenzene.
J. Bishop Tingle.

Carbithionic Acids. V. Preparation of New Carbithioic Esters and of Ethyl Chlorocarbithioate. J. Houben and Karl M. L. Schultze. Chem. Inst., Univ. Berlin. *Ber.*, 44, 3226–34.—*Ethyl methylcarbithioate* (*ethyl dithioacetate*), MeCSSEt, is prepared from MeMgI and CS_2, followed by Et_2SO_4; intensely yellow liquid with an odor of AcOEt, b_{11} 42–3°; d_4^{16} 1.036. Yield, 6%. It is hydrolyzed by aq. alc. NaOH, or aq. mineral acids to AcOH and mercaptan. *Ethyl ethylcarbithioate* (*ethyl dithiopropionate*), EtCSSEt, from EtMgBr, as above; intensely yellow liquid, b_{10} 60–1°. Yield, 3.7%. Me phenylcarbithioate (Me dithiobenzoate), is formed from PhMgBr, but the product is less pure than that described previously. Yield, 13%. *Methyl α-naphthylcarbithioate* (*methyl dithio-α-naphthoate*), $C_{10}H_7CS_2Me$, from α-$C_{10}H_7MgBrCS_2$ and Me_2SO_4; orange-yellow needles from MeOH, m. 54°; b_{16} 210°. Yield, 40%. It is quite stable in air. *Ethyl ester*, as above but with Et_2SO_4; orange-yellow crystals, m. 39–40°. It is stable in air. Yield, 43%. The above α-naphthoates are very stable towards conc. or dil. HCl, but are readily hydrolyzed by aq.-alc. NaOH to α-naphthoic acid and the resp. mercaptans. Et chlorocarbithioate (Et chlorodithioformate), $ClCS_2Et$, from EtSH, CS_2 and thiocarbonyl chloride; reddish yellow oil with a sharp odor, its vapor attacks the mucous membrane of the eye; m. below —40°; b_{19} 80–1°; b_{18} 74–5°. It is stable in absence of air or moisture. Yield, 39%. With K anthranilate it gives cinnabar-red crystals, consisting probably of *ethyl dithioisatate*. Organo-Mg halides convert it into RCS_2Et. With NaI, in acetone, it gives *iodocarbithioic ester*. Aq. KOH + As_2O_3 reduce the chloro ester to *polymeric dithioformic ester*, $C_3H_6S_2$; pale yellow oil, b_{19} 131–2°; b_{11} 115°. *Ethyl trithiocarbonate* is formed together with the above chloro ester and is the chief product if the proportion of CS_2 be reduced. Cf. following abstr.
J. Bishop Tingle.

Preparation of Orthotrithioformic Esters. J. Houben and Karl M. L. Schultze. Chem. Inst., Univ. Berlin. *Ber.*, 44, 3235–41; cf. preceding abstr.—The esters described below were prepared by b. anhydrous HCO_2H with the resp. mercaptans men-

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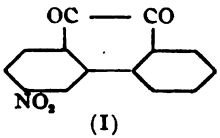
tioned. *Trimethyl orthotrithioformate*, $HC(SMe)_3$, from MeSH; white crystals, m. 16°; b_9 96°; b. 220° (decomp.). It becomes yellow when heated, colorless when cooled again. Yield, about 66%. With Br it appears to give R_2SBr_2, which is decomp. by H_2O into R_2SO and HBr; the reaction is reversed by HBr. Tri-Et orthotrithioformate, $HC(SEt)_3$, from EtSH; b_{11} 124–5°. Yield, 56%. Tribenzyl orthotrithioformate, $HC(SCH_2Ph)_3$, from $PhCH_2SH$; m. 102.5°, not 98°. Yield, 92%. The ester is also formed by heating $PhCH_2SH$ with anhydrous $(CO_2H)_2$. *Tri-p-cresyl orthotrithioformate*, from *p*-thiocresol; white, odorless crystals from alc., m. 109°. Yield, 50%. It produces eczema. *Tri-α-naphthyl orthotrithioformate*, $HC(SC_{10}H_7)_3$, from α-thionaphthol; crystals from glacial AcOH, m. 134°. Yield, 69%. It becomes green on exposure to light. *Triallyl orthotrithioformate*, $C_{10}H_{16}S_3$, from allyl mercaptan, at room temp., then at 50–65°; liquid, b_{19} 120–2°. It was not quite pure. J. B. T.

Phenanthrene Series. XXXII. Transition from the Phenanthrenequinone to the Phenanthrene Series. JULIUS SCHMIDT AND EBERHARD SAUER. Lab. Pure and Pharm. Chem. Techn. Hochsch., Stuttgart. *Ber.*, 44, 3241–55; cf. *C. A.*, 5, 3069.—At 140°, 3-nitrophenanthrenequinone, formula (I) below, is reduced by red P and aq. HI (d. 2.0) to 3-aminophenanthrene (II). Its *hydriodide* exists in 2 forms, the less sol. in H_2O is deposited in lustrous, rhombohedral crystals, m. 140°. The *isomeric salt* consists of slender, white needles, m. 244–5°. It is produced in much the larger quantity. Phenanthrenequinone and PCl_5, at 200°, give *2,9,10-trichlorophenanthrene* (III); white needles from ligroin, m. 144–5°. Yield, about 35% of the quinone. In glacial AcOH, CrO_3 oxidizes (III) to *2-chlorophenanthrenequinone* (IV); yellowish red needles from glacial AcOH, m. 252–3°. Yield, 20% of (III). *2-Chlorophenanthrophenazine* (V) from (IV) and *o*-phenylenediamine; white plates from CCl_4, m. 238°. In conc. H_2SO_4 the color is carmin-red, it is not changed by adding a nitrate. *2-Chlorophenanthrene quinoneoxime* (VI), or (VII), from (IV); greenish yellow crystals from alc., m. 180–5°. It may be a mixt. of (VI) and (VII). *2-Chlorophenanthrenequinonesemicarbazone* (VIII), or (IX), from (IV); slender, pale yellow needles from dil. alc., m. 220°. The mother liquor contains a *compound* in small quantity; large needles, m. 180°. *6-Chlorophenanthro-3-hydroxytriazine* (X), or (XI), from (VI) [or (VII)] and semicarbazine hydrochloride; crystals of *p*-chlorodiphenic acid, $ClC_6H_3(CO_2H)C_6H_3CO_2H$, are produced from (IV), H_2SO_4 and $K_2Cr_2O_7$. *Silver salt*, crystals from dil. alc., m. 270°



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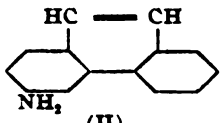

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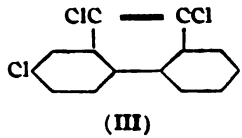

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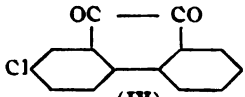

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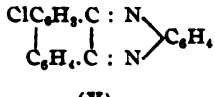

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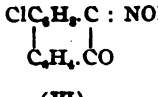

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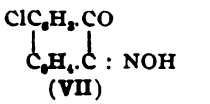

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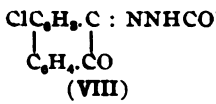

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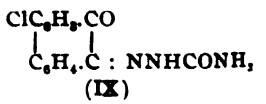

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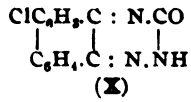

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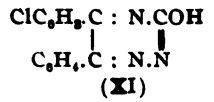

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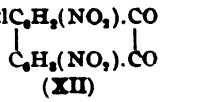

(XII)

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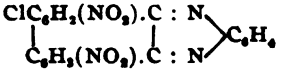
(decomp.). *2-Chlorodinitrophenanthrenequinone*, probably (XII), is formed from (IV) and b. HNO_3 (d. 1.52); yellow, lustrous crystals from glacial AcOH, m. 274°. *2-Chlorodinitrophenanthrophenazine*, (XIII), from (XII) and *o*-phenylenediamine;



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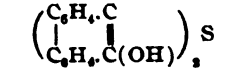
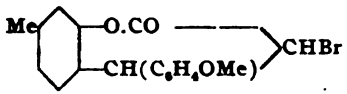


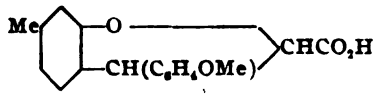
(XIV)

white, cryst. powder from glacial AcOH, m. 357°. *2-Chlorodinitrodiphenic acid*, $ClC_6H_3(NO_2)(CO_2H)C_6H_3(NO_2)CO_2H$, from (XII), H_2SO_4 and $K_2Cr_2O_7$; crystals from dil. alc., m. 269°. *Bis-9-hydroxyphenanthryl-10-sulfide* (XIV), is formed from 9-chloro-10-hydroxyphenanthrene, or from 9,9-dichlorophenanthrone and alc. K_2S; light brown, cryst. powder from C_6H_6, m. 223–4°. Yield, 16% of the OH compd. In conc. H_2SO_4 the color is dull brown. *Dibenzoyl derivative*, light brown, cryst. powder from C_6H_6, m. 262–3°. J. Bishop Tingle.

Interaction of Homologous Phenols with Methylcoumaric Acid Dibromide. II. R. Stoermer and C. Friemel. Chem. Inst., Univ. Rostock. *Ber.*, 44, 3256–66; cf. *C. A.*, 5, 3261.—*3-Bromo-4-[2-methoxyphenyl]-7-methylhydrocoumarin*, formula (I) below, is prepared from *m*-cresol and methylcoumaric acid dibromide; rectangular

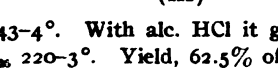


(I)



(II)

plates from dil. AcOH, m. 123°. It is not changed by aq. Na_2CO_3. Yield, 28.4%. Aq. NaOH hydrolyzes (I) to *2-[2-methoxyphenyl]-5-methylcoumarin-1-carboxylic acid* (II); rhombic plates from glacial AcOH, m. 199°. In soln. it exhibits a feeble blue fluorescence. Yield, 50% of (I). *Sodium salt*, yellow. *Piperidide*, $C_{22}H_{25}O_3N$, thin, colorless rods from dil. alc., m. 148–9°. *Methyl ester*, hexagonal plates from dil. alc., m. 75°. *Hydrazide*, small, colorless crystals from dil. alc., or C_6H_6 + ligroin, m. 110°. Yield, 87.5% of (II). With excess of $NaNO_2$ and AcOH it forms the *azide*, small needles, explodes when heated. With a smaller proportion of $NaNO_2$ the hydrazide forms a *diacid hydrazide*, m. 230°. B., abs. alc. converts the azide into *2-[2-methoxyphenyl]-5-methyl-1-urethylcoumaran* (III); very thin, colorless plates from dil. alc., m.



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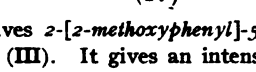

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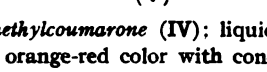
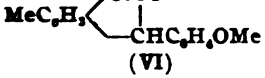


(V)

143–4°. With alc. HCl it gives *2-[2-methoxyphenyl]-5-methylcoumarone* (IV); liquid, b_{25} 220–3°. Yield, 62.5% of (III). It gives an intense, orange-red color with conc. H_2SO_4, changing to bluish green, then to blue when heated. Alc. and Na reduce it to *2-[2-methoxyphenyl]-5-methylcoumarin* (V), silky lustrous needles with a blue fluorescence from alc., m. 96–7°. *2-Methoxyphenyl-2-hydroxy-4-methylphenylacetic lactone* (VI), is prepared from *o*-methoxymandelic nitrile, *m*-cresol and conc. H_2SO_4; colorless,



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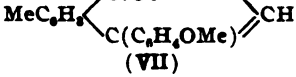

(VII)

lustrous crystals from dil. AcOH, m. 116–9°. Yield, 20% of the nitrile. It is converted into (V) by treatment with P_2S_5, followed abs. alc. and Na. *α,β-Bis-[4-hydroxy-6-methylphenyl]-2-methoxyhydrocinnamic acid*, $HOC_6H_2MeCH(C_6H_4OMe)CH(C_6H_2Me-$

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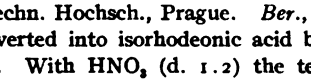
OH)CO_2H, is contained in the mother liquor from (I); colorless needles from acetone, m. 274°; mol. wt., in b. acetone, 371. Yield, about 13.7%. *Methyl ester*, small rods from alc., m. 225°. *Bis-p-nitrobenzoyl derivative*, $C_{32}H_{22}O_{11}N_2$, pale yellow, rhombic plates from glacial AcOH, m. 216°; mol. wt., in b. acetone, 718. *4-[2-Methoxyphenyl]-7-methylcoumarin* (VII), is formed together with the above cinnamic acid and is sepd. by its greater solubility; rhombic rods from glacial AcOH, m. 220°. Yield, 14%. It is also obtained by the interaction of (I) and quinoline. J. Bishop Tingle.

Condensation Products of Acid Halides. VIII. Hydrocarbon of the Cyclobutane Series. E. Wedekind and M. Miller. Chem. Lab., Univ. Strassburg. *Ber.*, **44**, 3285–7; cf. *C. A.*, **5**, 1441.—*2,2,4,4-Tetramethyl-1,3-diethyl-1,3-dihydroxycyclobutane*, formula (I) below, is prepared from EtMgBr and diketotetramethylcyclobutane; oil

(I) (II)

with an agreeable, aromatic odor, b_{30} 128–30°. Yield, nearly quant. With aq. HI (b. 127°), followed by glacial AcOH + Zn dust it gives *2,2,4,4-tetramethyl-1,3-diethylcyclobutane* (II); colorless, mobil liquid with a characteristic odor, b. 125°; mol. wt. (V. Meyer) 157–9. It is stable towards $KMnO_4$, cold. conc. H_2SO_4 or Br. J. B. T.

Degradation of Isorhodeose. Emil Votocek and Cyrill Krauz. Org. Lab., Roy. and Imp. Bohemian Techn. Hochsch., Prague. *Ber.*, **44**, 3287–90; cf. *C. A.*, **5**, 2249.—Isorhodeose was converted into isorhodeonic acid by aq. Br and the Ca salt into methyltetrose by H_2O_2. With HNO_3 (d. 1.2) the tetrose gives *l*-tartaric acid which was fully identified. This confirms the configuration



previously deduced for isorhodeose. It is the optical antipode of epirhamnose (isorhamnose). *Methyltetrosebenzylphenylhydrazone* is an oil. J. Bishop Tingle.

Remarks on Valency Isomeric Ammonium Salts. A. Hantzsch. *Ber.*, **44**, 3290–3.—In $CHCl_3$, Pr_4NI has a much stronger absorptive power than in alc. or H_2O. This is largely due to the higher absorptive power of the $CHCl_3$ itself. Beer's law applies to solns. in $CHCl_3$ of all concs. and also to those in alc., or H_2O (0.1–0.001 *N*). Similar results were obtained with Pr_3NMeI, in $CHCl_3$, alc., or H_2O and for dimethylpiperidonium iodide, in alc., or H_2O. J. Bishop Tingle.

***p*-Nitroanilinearsinic Acid.** L. Benda. L. Cassella and Co.'s Lab., Mainkur. *Ber.*, **44**, 3293–7; cf. *C. A.*, **5**, 2392 and following abstrs.—*2-Amino-5-nitrophenylarsinic acid*, $H_2NC_6H_3(NO_2)AsO(OH)_2$, is prepared from As_4O_6 and *p*-nitroaniline, at 210°; lustrous, orange-yellow prisms from H_2O, m. 235–6° (decomp.). *Acetyl derivative*, very readily hydrolyzed. *Diazonium derivative*, slightly colored; if forms *azo compounds* easily. B., dil. H_2SO_4 + KI convert the acid into 2-iodo-4-nitroaniline. *2-Hydroxy-5-nitrophenylarsinic acid*, $HOC_6H_3(NO_2)AsO_3H_2$, is formed by heating the amino compd. with aq. KOH; pale yellow, pulverulent crystals from H_2O when rapidly cooled, highly lustrous, pale, amber-colored, opaque crystals by slow deposition, m. 247–8° (decomp.). *Potassium salt*, almost colorless needles, or plates with 1 H_2O, from H_2O. *Dipotassium salt*, yellow, interlaced needles from aq. KOH + alc. *2-Hydroxy-3,5-dinitrophenylarsinic acid*, $HOC_6H_2(NO_2)_2AsO_3H_2$, from the preceding acid and HNO_3; pale yellow needles from H_2O, m. 237°. In alkali the color is orange, in aq. "hyposulfite" first deep red, then lighter. The Na hyposulfite reduces the hydroxynitroarsinic acid to *2,2'-dihydroxy-5,5'-diaminoarsenobenzene*; yellow powder. *Dihydro-*

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chloride, is isomeric with "salvarsan"; microcryst. When mixed with *p*-xylenol and oxidized with NaOCl, in presence of alkali, it gives a blue soln. of *indophenolarsinic acid*. J. BISHOP TINGLE.

Constitution of the "Isomeric Aminophenylarsinic Acids" and of Michaelis' Nitrophenylarsinic Acid. A. BERTHEIM AND L. BENDA. Frankfort a/M, Mainkur. *Ber.*, **44**, 3297–300; preceding and following abstrs.—3-Nitro-4-aminophenylarsinic acid ("nitroarsanilic acid"), $O_2NC_6H_3(NH_2)AsO_3H_2$, was converted into *m*-nitrophenylarsinic acid by means of the diazo reaction and it was also prepared, in the same manner, from 2-amino-5-nitrophenylarsinic acid and by nitrating phenylarsinic acid (Michaelis, *Ber.*, **27**, 2636 (1984); *Ann.*, **320**, 294). It is reduced by Na–Hg to *m*-aminophenylarsinic acid ("metarsanilic acid;" "isomeric aminophenylarsinic acid") (*C. A.*, **2**, 2392). J. BISHOP TINGLE.

***p*-Phenylenediaminearsinic Acid.** L. BENDA. Leop. Cassella and Co.'s Lab., Mainkur. *Ber.*, **44**, 3300–4; cf. preceding and following abstrs.—2-Amino-5-nitrophenylarsinic acid (*p*-nitroanilinearsinic acid), $H_2NC_6H_3(NO_2)AsO_3H_2$, is reduced by $Fe(OH)_2$ to *2,5-diaminophenylarsinic acid*, $(H_2N)_2C_6H_3AsO_3H_2$; slender needles, darkens and decomp. 210–5°. It gradually becomes violet on exposure to light and air. Its *diazonium derivative* gives the following *azo compounds* with the substances mentioned: "*R salt*" (reddish violet); *resorcinol* (yellowish orange); *β-naphthol* (red). The diazonium compd. gives with Cu, *m*-aminophenylarsinic acid, which was diazotized and treated with β-naphthol; the resulting *azo dye* is a red powder. In aq. Na_2CO_3 its color is orange. It is reduced by aq. NaOH and "hyposulfite" to *m*-aminophenylarsinic acid. J. BISHOP TINGLE.

***o*-Aminophenylarsinic Acid (*o*-Arsanilic Acid).** L. BENDA. Leop. Cassella and Co.'s Lab., Mainkur. *Ber.*, **44**, 3304–8.—*5-Nitro-2-oxalylaminophenylarsinic acid*, is prepared from 5-nitro-2-aminoarsinic acid and $C_2H_2O_4$, at about 175°; it was reduced by Fe powder and AcOH and the product diazotized and treated with Cu powder, giving *oxanilidediarsinic acid*, $C_7H_7O_4NAs$; silvery lustrous plates. B., dil. H_2SO_4 hydrolyzes it to *o-aminophenylarsinic acid* (*o-arsanilic acid*), $H_2NC_6H_4AsO_3H$; needles from H_2O, m. 153°. It is vey readily sol., and at 80–5° is decomp. by dil. HI into *o*-iodoaniline. *Barium salt*, lustrous crystals. *Silver salt*, is first amorphous and curdy but changes suddenly to lustrous needles. The *o*-aminophenylarsinic acid is more toxic than its isomers, the *m*- and *p*-acids are equal in this respect. Its *diazonium compound* is converted readily into *o-hydroxyphenylarsinic acid* and with "hyposulfite" is reduced to *o,o'*-diaminoarsenobenzene. The isomeric aminophenylarsinic acids are readily distinguished by the following test. The acid is diazotized and mixed on filter paper with β-naphthol and aq. Na_2CO_3; the resulting orange *dyes* when treated with aq. NaOH become dull red to violet-red in the case of the *m*- and *p*-compds. but the *o*-dye remains yellow. J. BISHOP TINGLE.

Acylated Salicylic Acids. ALFRED EINHORN, LEO ROTHLAUF AND RUDOLF SEUFFERT. Lab. Roy. Acad. Sci., Munich. *Ber.*, **44**, 3309–13.—*Benzoylsalicylic acid*, $BzOC_6H_4CO_2H$, is prepared by dropping BzCl (10 g.) into a mixt. of salicylic acid (10 g.), pyridine (15 g.) and Et_2O (50 cc.), at 0° and is sepd. from salicylic acid by pptn. with AcOH from aq. Na_2CO_3 soln.; needles from dil. alc., m. 132°. Yield, 82–3%. It is also formed from Na salicylate and BzCl, at the ordinary temp. Yield, about 50%. *Sodium salt*, prisms from dil. alc. Isovalerylsalicylic acid, $Me_2CHCH_2CO_2C_6H_4CO_2H$, and cinnamoylsalicylic acid, $PhCH:CHCO_2C_6H_4CO_2H$, are prepared in a similar manner. *Carbothymoxysalicylic acid*, $PrC_6H_3MeOCO_2C_6H_4CO_2H$, is formed from salicylic acid, thymolcarbonyl chloride, Me_2NPh and C_6H_6; stellate needles from AcOEt, m. 118°. Yield, 56% of the salicylic acid. *Carbomenthoxysalicylic acid*,

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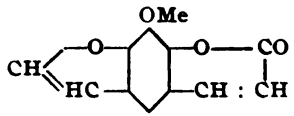
$C_{10}H_{19}OCO_2C_6H_4CO_2H$, from Na salicylate and mentholcarbonyl chloride, in acetone; large, hexagonal prisms from ligroin, m. 121.5°. Yield, 45%. J. BISHOP TINGLE.

Hemopyrrole. HANS FISCHER AND E. BARTHOLOMÄUS. II Med. Clinic, Munich. *Ber.*, 44, 3313-7; see Knorr and Hess, *C. A.*, 6, 92.—Hemopyrrole prepared by reduction with HI + Ph_4I, was finally distilled, the portion b_{12} 96° gave a picrate, softens about 116°, m. 120–2°. Yield, of colorless and non-fluorescent hemopyrrole 20.6% of the hemin. It was identical with Piloty's from Sn and HCl. A repetition of Knorr and Hess' work showed that their "2,4-dimethyl-3-acetylpyrrolehydrazone" is really a ketazine. By a modification of the method the yield is 65% of the dimethyl acetylpyrrole. The ketazine picrate m. 208–10°. Reduction of the ketazine, at 200–20°, gives an oil which was converted into a *picrate* (m. 62–3°) and an *azophenylsulfonic acid derivative*, $C_{14}H_{17}O_3N_3S$; bright red, concentric needles. It does not react with "dimethylaminobenzaldehyde" and does not form a bluish red dye with alk. 1,8-aminonaphthol-4,6-disulfonic acid. The sulfonic acid compd. is reduced by Zn dust to an *amine*, which gives an intensely red dye with Na 2-naphthol-3,6-disulfonate. These results show that the original azo dye is not a diazoamino compd. No cryst. compd. could be obtained from hemopyrrole and phenyldiazoniumsulfonic acid, consequently hemopyrrole is not identical with the reduction product 2,4-dimethyl-3-acetylpyrroleketazine. J. BISHOP TINGLE.

Composition of Tannin. LEO F. ILJIN. *Ber.*, 44, 3318–9.—The av. values for purified tannin obtained previously (*C. A.*, 3, 2303) are C 54.13 and H 3.22%. The difference between these results and those of Steinkopf and Sargarian (*C. A.*, 6, 234) is probably due to the fact that purified tannin is highly hygroscopic. J. B. T.

Behavior of Metallic Hydroxides to Alkylenediamine Solutions. WILHELM TRAUBE. Chem. Inst., Univ. Berlin. *Ber.*, 54, 3319–24.—Aq. NH_3 (25%) dissolves only 2–3% of $Cu(OH)_2$; in aq., primary, aliphatic amines its soly. is smaller and it is insol. in aq. secondary, aliphatic amines. In 33% aq. soln. 0.86 and 0.59 g. of $Cu(OH)_2$ dissolve in 100 cc. of $MeNH_2$ and $EtNH_2$, resp. The soly. of $Cu(OH)_2$ in aq. ethylenediamine decreases with the conc. of the amine, a 23.02% amine soln. contains 14.03 of $Cu(OH)_2$, corresponding to the *compound*, $Cu(C_2H_8N_2)_2.(OH)_2$. These solns. are dark bluish violet, they dissolve cellulose very readily and absorb O from the air. The following *compounds* have been obtained in a similar manner: $Ni(C_2H_8N_2)_2.(OH)_2$; $Zn(C_2H_8N_{2n})$-$(OH)_2$; $Ag(C_2H_8N_2)_2.OH$. In 100 cc. of 2% aq. ethylene- and propylenediamine solns. 9.583 and 13.0 g., resp., of $Cu(OH)_2$ dissolve. J. BISHOP TINGLE.

Constitution of Xanthotoxin and its Relationship to Bergapten. H. THOMS. Pharm. Inst., Univ. Berlin. *Ber.*, 44, 3325–32.—The sepn. of xanthotoxin, formula (I) below, from the ethereal oil of *Fagora xanthoxyloides* Lam. has been described by



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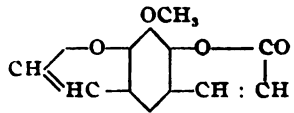
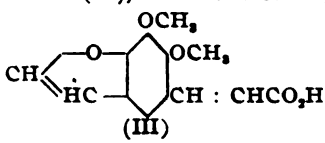


(II)

Priess (*C. A.*, 5, 3323). It is accompanied by bergapten, which is sepd. by repeated crystn. and is identical with the compd. from bergamot oil. Nitroxanthotoxin (II) m. 233°. *Methylxanthotoxic acid* (III), from xanthotoxin, MeI and MeOH; opaque



(III)

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crystals, m. 114–7°. *Methyl ester*, large, colorless plates, m. 44°. At 205–10°, KOH hydrolyzes xanthotoxin to 2,3,4-trihydroxybenzoic acid. Yield, about 12%. Both xanthotoxin and bergapten are toxic to fish, the former more strongly than the latter. It attacks the central nervous system. These results and those previously published lead to the formulas above. J. BISHOP TINGLE.

Separating Liquids having Boiling Points near each other (GOLODETZ). 2. Absorption Spectra of Nitro Compounds (ZELINSKII, ROZANOV). 2. Phosphorescence of Organic Compounds (KOWALSKI). 2.

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11. BIOLOGICAL CHEMISTRY.

WILLIAM J. GIES.

A. GENERAL.

FRANK P. UNDERHILL.

Relation of Biological Chemistry to Home Economics. WILLIAM J. GIES. *Biochem. Bull.*, 1, 42–50.—Address. An outline of a lab. course in the elements of normal nutrition ("physiological chemistry") for students of domestic science. W. J. G.

Suggestions to Teachers of Biochemistry. I. A Proposed Chemical Classification of Lipins, with a Note on the Intimate Relation between Cholesterols and Bile Salts. JACOB ROSENBLOOM AND WILLIAM J. GIES. Biochem. Lab., Columbia Univ. *Biochem. Bull.*, 1, 51–6.—"Lipins" is proposed as a generic name for fats and fat-like substances ("lipoids"), including some of their fat-like analytic and synthetic derivs. In practically all cases lipins are insol. in conc. neutral saline solns., but are sol. in hot alc. or in warm ether or in both. The skeleton of the proposed classification, which is primarily chem. in character, is as follows: I. *Natural aliphatic lipins: A.* Simple lipins, (*a*) most fatty acids, several unsatd. acids and various hydroxy acids of these types, (*b*) salts and esters of acids of (*a*), (1) soaps, (2) waxes, (3) fats and fatty oils, (*c*) alcs. of the kinds obtainable from waxes; *B.* conjugate lipins ("lipoids"), (*a*) proteolipins, (*b*) glycolipins, (*c*) phospholipins, (*d*) glyco-phospholipins. II. *Natural carbocyclic lipins: A.* Sterols—terpeno-*alcoholic* derivs., "sterins," "lipoids;" *B.* esterols—terpeno-aliphatic waxes; *C.* cholates—terpeno-*acid* derivs. of hepatic origin (*e. g.*, bile acids). III. *Natural lipins of undetd. constitution: A.* Chromolipins ("lipochromes"); *B.* miscellaneous substances. IV. *Artificial lipins:* Lab. products analogous to natural lipins. The authors discuss the possible derivation of cholic acid and bile salts (cholates) from cholesterol. They also suggest that cholesterol gallstones arize when, among other causes, the transformation of cholesterol into bile salts is materially diminished in degree, with a consequent marked increase in the conc. of cholesterol in the bile. W. J. G.

Chemistry of the Cell. WM. J. GIES, WM. H. WELKER, E. D. CLARK, JACOB ROSENBLOOM, W. H. EDDY, ISIDOR GREENWALD, A. P. LOTHROP, REUBEN OTTENBERG. Coll. Physicians, Surgeons, New York. *Biochem. Bull.*, 1, 65–93.—A general review of present knowledge regarding intracellular water, salines, carbohydrates, lipins, proteins, extractives, enzymes and factors in immunity. W. J. G.

The Heat Coagulation of Proteins. II. The Action of Hot Water upon Egg Albumin and the Influence of Acid and Salts upon Reaction Velocity. HARRIETTE CHICK AND C. J. MARTIN. Lister Inst. of Preventive Med. *J. Physiol.*, 43, 1–27.—When precautions are taken to maintain a const. conc. of H ions, heat coagulation of egg albumin is a reaction of the 1st order, coagulation rate being proportional to conc. of protein.

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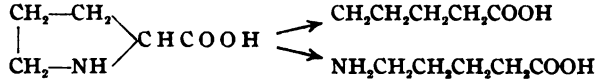
Heat-coagulation consists of 2 processes: (1) The reaction between protein and hot water (denaturation); (2) the sepn. of the altered protein in particulate form (agglutination). The amt. of acid combined as protein acid salts, when acid is added to a soln. of protein, depends on the conc. of free acid. These salts undergo hydrolysis, which accounts for the free acid always present in such solns. On treatment by hot H_2O the protein acid salts are pptd. as such; the % of acid combined with them being dependent on the acidity of the soln. at the time of coagulation. The velocity of the reaction is conditioned by the acidity (H ion conc.) of the soln. NaCl and $(NH_4)_2SO_4$ up to a conc. of 3 times N greatly lower the rate of the reaction. J. F. LYMAN.

Checking the Production of Reducing Sugar in the Diastatic Hydrolysis of Amygdalin. J. GIAJA. *Compt. rend. soc. biol.*, 71, 509–10.—The greater the amt. of HCN set free the smaller the amt. of glucose which is produced by the diastatic action of *Helix* on amygdalin. I. K. PHELPS.

Alterations in the Physical States of Colloids. XII. The Peculiarities of Protein Ions. CARL SCHORR. Biol. Versuchsanstalt, Vienna. *Biochem. Z.*, 37, 424–51.—Investigations chiefly with serum and with gelatin solns. The protein ions formed when a base or acid is added to a protein soln. reveal themselves by their cond., by their increased viscosity as compared with the un-ionized mols., and by the greater difficulty with which the proteins in the ionized state are pptd. by alc. Theoretically these properties should reach a max. when sufficient base or acid has been added to completely prevent hydrolytic dissociation of the protein salt. Further addition of acid or base, should, according to the law of mass action, depress the electrolytic dissociation of the protein salt and result in a depression of the physical characters of the soln. which are characteristic of protein ions. S. finds this to be the case. On addition of acid or alkali to dialyzed serum or to gelatin soln. a point at about 0.02 *N* NaOH or HCl is found where the protein is least precipitable by alc. A similar max. is also shown in the NaOH-protein viscosity curve, when the viscosity due to the presence of the NaOH itself is deducted from that of the NaOH-protein soln. The mixing of NaOH with a protein soln. results in a decrease in the cond. of the NaOH due to replacement of the OH with comparatively sluggish protein anions. This depression also passes through a max. value, which was found at 0.04 *N* alkalinity. Long standing with the alkali results in changes of the physical properties of the solns. which are probably in part at least due to hydrolysis of the proteins. The effect of the presence of neutral salts on the properties of the protein solns. is barely detectable, but is in the direction indicating a slight depression of the ionization of the protein.

D. D. VAN SLYKE.

Biochemical Transformation of α-Pyrrolidinecarbonic Acid into *n*-Valeric Acid and δ-Aminovaleric Acid. CARL NEUBERG. Kgl. Landw. Hochsch., Berlin. *Biochem. Z.*, 37, 490–500.—Proline when submitted to putrefaction splits into *n*-valeric acid and δ-aminovaleric acid



The former was isolated as the Ca salt from the distillate of the acidified digest. The latter was obtained as the hydrochloride from the residue after the undestroyed *dl*-proline had been removed as Cu salt. The α-naphthylisocyanate of *dl*-proline m. 171–2°.

D. D. VAN SLYKE.

Synthesis of Lower Peptides by a New and Direct Method, Akin to Biological Reactions. L.-C. MAILLARD. *Compt. rend. soc. biol.*, 71, 546–9.—In presence of glycerol at 170° in an open dish glycocoll was converted into cyclogylcylglycine; sarcosine,

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alanine and leucine were converted similarly into analogous derivs. Such mixed cyclopolypeptids as cycloleucylvaline were formed by the same method. Further, in the case of glycocoll, triglycylglycine was formed. This shows the formation of triglycylglycine at a much lower temp. than is commonly used. This suggests that glycerol may play a part in the body in the synthesis of proteins. I. K. PHELPS.

Researches on Reducing Enzymes. A. BACH. *Arch. sci. phys. nat.*, 32, 27–41; see *C. A.*, 5, 2258. ERNEST D. CLARK.

The Indophenol Oxidase of Mammalian and Avian Tissues. H. M. VERNON. Physiol. Lab., Oxford. *J. Physiol.*, 43, 96–108.—The oxidase power of various tissues in 12 species of mammals, 7 species of birds and 4 species of cold-blooded animals was detd. by the indophenol reaction of V. (*C. A.*, 5, 3837). Heart muscle is richest in indophenol oxidase. The amts. present in the various tissues of the rabitt, cat and dog roughly correspond with their degree of O satn. as detd. by Ehrlich. The oxidase power is parallel with the property of sustained activity of the tissues. The pectral muscle of vigorous flying birds is almost as rich in oxidase as is the heart muscle. Red muscles of mammalia contain more oxidase than white muscles, the tongue and diaphragm being especially well supplied. The pectoral muscle of the tame duck is practically free from oxidase. In cold-blooded animals there is little oxidase present but the order of activity of the tissues is the same as in the mammals. In small embryos the oxidase is at a minimum, increasing rapidly with embryonic development and for the first 2 weeks of pre-natal existence. The liver forms an exception. For a week or 2 after birth it is richer in oxidase than the adult liver. J. F. LYMAN.

The Probable Formation of Adrenaline in the Animal Body. CASIMIR FUNK. *Proc. Physiol Soc.; J. Physiol.*, 43, 2.—3,4-Dihydroxyphenylalanine when incubated with suprarenal glands, or with a mixt. of suprarenals, pancreas and liver did not change in noticeable amts. to adrenaline. J. F. L.

Reaction of Enzymes and Antienzymes. MARTIN JACOBY. Biochem. Lab., Krankenhaus Moabit, Berlin. *Biochem. Z.*, 34, 485–94.—Rennin which has been subjected to shaking requires less horse serum (antirennin) to inactivate it than that which was not previously shaken. G. M. MEYER.

The Influence of Iodine on Autolysis. LEON KEPINOFF. Inst. f. exp. Krebsforschung, Heidelberg. *Biochem. Z.*, 37, 238–48.—Addition of I to autolyzing rabbit liver increases the rate of autolysis. Addition of KI has no effect. Injection of Lugol's soln. and of KI, into rabbits 6–24 hrs. before they are killed, causes acceleration of the subsequent autolysis of the livers. Apparently some of the KI may, in the living body, give rise to I. Treatment with repeated injections of KI results in still more rapid autolysis of the liver after death. The serum of animals treated with KI, when mixed with additional KI, showed slightly accelerated autolysis. The digestion by trypsin of liver tissue which had been heated to 95° was depressed by addition of KI. D. D. VAN SLYKE.

The Oxidation of Isolated Animal Tissues. ARTHUR HARDEN AND HUGH MACLEAN. Lister Inst., Biochem. Dept. *J. Physiol.*, 43, 34–45.—Minced tissues did not produce more CO_2 nor absorb more O after the addition of dextrose, glycogen, Na lactate, or Na pyroracemate than did the control tissues to which none of these were added. No more CO_2 was produced by the tissues from dextrose when incubated in an atm. of O than when in an atm. of N or H. Tissue juices prepared by the aid of kieselguhr and H_2O, and saline exts. of tissues possess little or no respiratory activity. Grinding the minced tissues with sand or mixing them with kieselguhr materially lowered the oxidation process. Antiseptics act in the same direction. An app. for estg. the post-mortem gaseous metabolism of minced tissues is described. J. F. LYMAN.

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B. METHODS AND APPARATUS.

STANLEY R. BENEDICT.

Methods of Estimating Trimethylamine in Urin. Lecithin Metabolism. P. CACCIA. *7th Intern. Congr. Appl. Chem.*, 1909, 69–73; *J. Chem. Soc.*, 100, II, 550. E. J. C.

The Determination of the Total Stomach Contents. ARNOLD GALAMBOS. III Med. Klinik. Budapest. *Z. klin. Med.*, 72, 555–62.—The secretory activity and motility of the stomach can be detd. in one operation. M. S. F.

The Acids in Urin. ERNST MAGNUS-ALSLEBEN. Med. Klinik, Basel. *Z. klin. Med.*, 73, 428–39.—The presence of large amts. of organic acids could be regularly demonstrated by the Folin method. The volatil fatty acids are not as prominent as recent work would indicate (cf. Molnar, *C. A.*, 5, 102). M. found the fatty acids of the urin to be equiv. to 40–90 cc. of 0.1 *N* alkali. They were detd. as follows: 150–250 cc. urin were treated with cryst. H_3PO_4 to make about a 6% soln. of this acid, and the mixt. subjected to steam distillation. The CO_2 was pptd. with conc. BaO, the ppt. filtered off and the soln. evapd. on the water bath. The resulting soln. was subjected to a second distillation with H_3PO_4, and finally titrated while hot. Control trials with AcOH showed the method to be reliable. The 2 distillations are necessary, however. Formic, acetic, and propionic acids administered in large amts. to a dog did not lead to an increase in the volatil fatty acids of the urin. M. S. F.

The Man-machine—the Remarkable Perfection of the Human System as a Mechanism. J. B. HUBER. *Sci. Am.*, 104, 60–72.—This is a description of the app. and methods used in the expts. of J. Amar (E. below). WM. P. GARRETY.

Separate Determination of Phenol and *p*-Cresol in Urin. M. SIEGFRIED AND R. ZIMMERMAN. Physiol. Inst., Univ. Liepzig. *Biochem. Z.*, 34, 462–72.—Urin (3 l.) is made slightly alk. with NaOH and evapd. to $^1/_6$ its original vol. This is distilled with steam after adding 150 g. conc. H_2SO_4 and 150 cc. H_2O, until the distillate gives no test with Millon's reagent. An aq. suspension of 30–40 g. $NaHCO_3$ is added to the distillate which is again distilled with steam until Millon's test is negative. To this distillate 3 g. NaOH and 18 g. $Pb(OAc)_2$ are added and the mixt. warmed on the water bath for 15 min. and steam distilled until ammoniacal $AgNO_3$ is no longer reduced by the distillate. Sufficient H_2SO_4 (1 : 1) is added to acid reaction and steam distillation continued until Millon's reaction is negative. This distillate is neutralized with NaOH conc. and made up to 200 cc. in a graduated flask. *p*-Cresol and phenol are detd. in this according to a previously described method (*C. A.*, 5, 2488). Normal urin contains on the av. 0.0173 g. *p*-cresol and 0.0127 g. phenol per l. G. M. MEYER.

Determination of Urea in the Blood. A. JAVAL. *Compt. rend. soc. biol.*, 71, 399–401.—Polemic against Frédéric Aronssohn (*C. A.*, 6, 248). I. K. PHELPS.

Determination of Urea in the Blood. FRÉDÉRIC ARONSSOHN. *Compt. rend. soc. biol.*, 71, 432–3.—Answer to A. Javal. See preceding abstr. I. K. PHELPS.

Comparison of the Estimation of Urea in the Blood Serum and in the Total Blood. WIDAL, ANDRÉ WEILL AND LAUDAT. *Compt. rend. soc. biol.*, 71, 492–4.—Polemical against Aronssohn (*C. A.*, 6, 248) in which the authors show by new analytical work that the results first obtained by them when their method, subsequently used by Aronssohn, was first brought out, indicate no appreciable difference between the amt. of urea found in blood serum and that found in the total blood. I. K. PHELPS.

Detection of Small Quantities of Glucose and Galactose in Presence of Lactose. H. BIERRY AND ALBERT RANC. *Compt. rend. soc. biol.*, 71, 440–1.—The samples are

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heated with Ph hydrazine for 20 min. in a sealed tube at 100°. The excess of Ph hydrazine is removed with benzene. The liquid is satd. with $MgSO_4$ before treating with EtOAc. After sepg. from this and evapg. under diminished pressure the hydrazones of both glucose and galactose are crystallized. These hydrazones, when dissolved in H_2O and heated with acetate of Ph hydrazine on the water bath for some time, give on cooling insol. glucosazone and galactosazone. I. K. PHELPS.

Determination of Cholesterol in the Tissues. A. GRIGAUT. *Compt. rend. soc. biol.*, 71, 441–2.—Estns. of cholesterol in the tissues are difficult rather because of an incomplete extraction with Et_2O, even after a 6-hr. extraction in a Soxhlet, than because of failure of the methods to show total cholesterol. This difficulty is overcome by heating in an autoclave at 110° with a 20% soln. of Na_2CO_3 in H_2O, then repeatedly extracting with fresh portions of Et_2O (cf. following 2 abstrs.). I. K. PHELPS.

Method of Estimating Cholesterol in the Serum and in the Tissues. A. GRIGAUT. *Compt. rend. soc. biol.*, 71, 513–5.—Definit amts. of serum or hashed tissue in 1% Na_2CO_3 soln. in 50% alc. is heated 25 min. in a steam bath. On cooling Et_2O extractions remove the cholesterol which is first washed in the Et_2O exts. before the Et_2O is evapd. The cholesterol is taken up in 5 cc. of $CHCl_3$ treated with 2 cc. of Ac_2O and 2 drops of conc. H_2SO_4. Liebermann's reaction develops in about ½ hr. when the color is compared with a soln. of known content of cholesterol treated as the sample has been treated. Results comparable with gravimetric results are obtained in this way, the gravimetric being slightly more exact (cf. preceding and following abstrs.).
I. K. PHELPS.

Determination of Lipoids in the Tissues and Animal Organs. E. GÉRARD. *Compt. rend. soc. biol.*, 71, 590–1.—Polemic against Grigaut (cf. *C. A.*, 4, 2513, 2514; also 2 preceding abstrs.) adding new results confirming earlier work. I. K. PHELPS.

Pettenkofer and Voit's Method for the Determination of Respiratory Exchanges in Small Animals. R. MOOG. *Compt. rend. soc. biol.*, 71, 520–2.—The O_2 and CO_2 per hr. was detd. and the respiratory quotient in the case of 3 guinea pigs. H_2O is absorbed in H_2SO_4 and the CO_2 in KOH for all of the air in the enclosed space. Excreta during the operation are recovered and weighed. The device proves to be applicable for small animals. I. K. PHELPS.

Determination of Urea in the Urin. A. BONCHEZ. *Compt. rend. soc. biol.*, 71, 537–8.—Analyses made in duplicate of urea content of urins by the Folin procedure and by the modification of it by L.-G. de Saint-Martin, where LiCl is substituted for $MgCl_2$, gave concordant results. I. K. PHELPS.

Clarification of Urin Preparatory to Testing for Albumin. A. BONCHEZ. *Compt. rend. soc. biol.*, 71, 582–3.—If talc was used to clarify urin before testing for albumin traces of albumin disappeared in the talc., and, when 4 g. of albumin was added, as egg white, only ½ the amt. could be recovered. I. K. PHELPS.

A New Method for the Quantitative Determination of the Free Hydrochloric Acid in the Gastric Juice. J. HOLMGREN. Finska. *Läkaresallskapets Handlinger*, 53, 83 (1911); through *Apoth. Ztg.*, 26, 487.—A drop of dil. acid soln. placed on a horizontal piece of filter paper gives a moist ring, the center of which is acid in reaction and the periphery neutral. The relation between the areas of the acid and non-acid portion of the moist spot is directly proportional to the acid content of the soln. under exam. The ratio between 2 solns. is expressed in terms of the square of the radius of the inner acid ring divided by the difference between the square of outer and inner rings. In making the test there is used a stamp bearing a printed millimeter scale, which, on being moistened with Congo-red soln. and pressed against the filter paper containing the moist spot under exam., permits the radii of the inner

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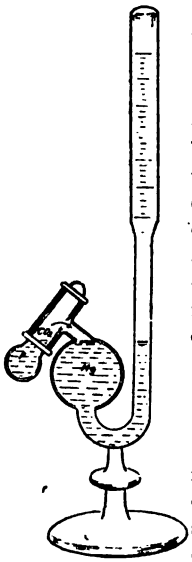
and outer rings to be read directly. The value found by calculation fron the readings is multiplied by the const. for the paper and gives the % of acid in the soln.

A. SEIDELL.

A New Precision Fermentation Saccharometer. SÖHLE. *Vierteljahrschr. prakt. Pharm.*, 1911, 183; through *Apoth. Ztg.*, 26, 639.—The sample of urin is placed in the bulb *F* (see Fig.) together with the yeast and after standing in a warm place the reading of the Hg column is taken. A. SEIDELL.



Detection and Determination of Sugar in the Urin. A. C. ANDERSEN. Univ. Copenhagen. *Biochem. Z.*, 37, 262–5.—Charcoal can not be used to clear neutral sugar solns. for polarization, because it adsorbs sugar. The adsorption is marked even in the presence of 5% HCl, recommended by Bang, but is depressed to a comparatively small % by addition of ¼ vol. of 50% AcOH. For decolorizing urin the following process is recommended: 40 cc. urin are dild. with 50% AcOH to 50 cc., and 4 g. powdered blood charcoal are added. The mixture is shaken several times during the next 5–10 mins. It is then filtered and the filtrate used for either polarization or titration by Bang's method.

D. D. VAN SLYKE.

Contributions to the Physiology and Pathology of Carbohydrate Metabolism. I. Methods. K. REICHER AND E. H. STEIN. II med. Klinik, Univ. Berlin. *Biochem. Z.*, 37, 321–36.—The color reaction of α-naphthol with sugars is made the basis of a colorimetric method for the detn. of small amts. of sugar. In a 25 cc. glass-stoppered measuring cylinder one places 10 cc. conc. H_2SO_4 and 50 mg. of α-naphthol. Two cc. of the soln. to be analyzed are allowed to flow in a layer over the H_2SO_4. The solns. are then gradually mixed by rotating the cylinder. The soln. is allowed to cool, then filled up to the 20 cc. mark with H_2SO_4. The cylinder is stoppered and the soln. mixed, air bubbles being avoided. A control is prepared in the same manner with a 0.02% glucose soln., and the 2 solns. are compared in a colorimeter, the depth of the layer of control soln. being varied until its color is of intensity equal to that of the soln. analyzed. The control soln. is most conveniently made by dilution of a 0.2% glucose soln. which contains 10% of $ZnSO_4$ as preservative. Physiological solns. are freed from protein with colloidal $Fe(OH)_3$ by a modification of the method of Rona and Michaelis. To 2 cc. serum 1 cc. of satd. K_2SO_4 soln. is added; the mixt. is dil. with H_2O to 10 cc. From a buret 5–7 cc. of $Fe(OH)_3$ soln. are added. The soln. is then diluted to 20 cc. and filtered. The filtrate is free from both Fe and protein. D. D. VAN SLYKE.

A New Viscosimeter and its Use for Blood and Blood Serum. GEORGE F. WHITE. U. S. Fish Comm. Lab., Woods Hole. *Biochem. Z.*, 37, 482–9.—The viscosimeter consists of a horizontal capillary 7 cm. long and of 0.1 mm. bore, at each end of which rize arms with cylindrical chambers of accurately detd. vol. (3.6–3.8 cc.). The liquid is forced from one arm into the other by air pressure from a gasometer, the pressure being regulated by a levelling bulb attached to the air reservoir. The chief advantage over the Ostwald form of viscosimeter, in which the liquid is drawn through a capillary by the force of gravity acting on its own mass, is that in the new instrument the liquid does not gain kinetic energy. The blood of the dogfish was collected, cooled to 0° to prevent coagulation, and its viscosity detd. to be 3.896 times that of H_2O at 0°. The increase of the rate of flow of the serum with increase of temp. is a linear function between 30° and 52°. At 52° the fluidity curve reaches a max., and above that temp. it falls rapidly. The bend in the curve indicates the point at which the fibrinogen

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not removed in the original, spontaneous coagulation, begins to coagulate from the heat. This bend in the fluidity curve of a colloid soln. is an accurate indication of the temp. at which the colloid is pptd. D. D. VAN SLYKE.

Estimation of Milk Fat (OERUM). 12. Two New Extraction Apparatus for Liquids (KOOLMAN). 1. Estimation of Active Principle of Suprarenal Gland (HALE, SEIDELL). 17. Determination of Gliadin in Flour (HOAGLAND). 12.

C. BACTERIOLOGY.

ERNEST D. CLARK.

The Relation of Parasitic Fungi to the Contents of the Cells of the Host Plants. I. The Toxicity of Tannin. COOK AND TAUBENHAUS. Delaware Expt. Sta., *Bull.* 91. —Different types of culture media containing varying amts. of tannin were inoculated with a large number of species of parasitic and saprophytic fungi known to produce plant diseases. Tannin inhibited the growth of the fungi and this effect was more pronounced in the parasites than in the saprophytes. Small amts. of tannin had a stimulative action upon growth and fruiting but usually 0.1–0.4% tannin inhibited strongly. Na tannate had nearly the same effect in all cases as did the free tannic acid Com. tannic acid is slightly more toxic than the fresh extract of oak bark. Fungi were easily able to penetrate thin sheets of cork treated to remove the tannin but were not able to do so when such sheets were again satd. with a tannin soln. The resistance of certain plants to attacks of fungous diseases is due to tannin in their cells as one factor. E. D. CLARK.

The Mechanism of Alcoholic Fermentation. A. LEBEDEV. *Bull. soc. chim.*, 9, 953–7; see *C. A.*, 5, 3298. J. J. M.

Action of Certain Bacteria on Proteins. F. A. BAINBRIDGE. Lister Inst., London. *J. Hyg.*, 11, 341–51.—When solns of pure egg-albumin, serum-protein and alkali-albumin are inoculated with large seedings the bacteria diminish in number, but small seedings increase slightly. Growth is considered to be due to traces of non-protein nitrogenous substances. There is no evidence that bacteria are able to break down pure egg-albumin or serum-protein. Even in the presence of sufficient non-protein nitrogenous food to ensure vigorous growth, the organisms exam. (pus cocci, *B. proteus* and typhoid-colon group) do not break down appreciable amts. of egg-albumin and serum-protein. J. H. MITCHELL.

Action of Nitrates and Nitrites of Dysentery Organism Killed by Various Processes, and of Filtrates from Fluid Cultures. W. J. LOGIE. Glasgoe Univ. *J. Hyg.*, 11, 361–72.—The reduction of nitrites by certain dysentery bacilli is not due to a sol., extra-cellular enzyme. Dysentery bacilli, and *B. coli* killed by a minimal degree of heat have little, if any, effect in reducing nitrites. Organisms killed by antiseptics, or by acetone do not reduce nitrites or nitrates. Even when all the organisms are not dead, reduction may be prevented by antiseptics. The high antiseptic value of tetrachloro-*o*-biphenol, tetrabromo-*o*-cresol, *p*-chloro-*m*-cresol, and hexabromodioxy-diphenylcarbinol has been established for the organisms of the dysentery group. J. H. MITCHELL.

Determination of Phenol and *p*-Cresol in their Mixtures. Hugo DITZ AND FRIEDRICH BARDACH. Tech. Hochschule, Prague. *Biochem. Z.*, 37, 272–312.—The authors have re-tested the method of Br titration originally proposed by Ditz and Chauser (*Chem. Ztg.*, 22, 732 (1898)) and have confirmed its accuracy. D. D. VAN SLYKE.

Influence of Temperature on the Action of Phosphates. HANS EULER AND HJALMAR OHLSEN. Hochschule, Stockholm. *Biochem. Z.*, 37, 313–20.—Yeast dried at less

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than 40° yields, on extraction with H_2O, a soln. of an enzyme which causes phosphates to enter completely into organic combination with the products of the partial fermentation of glucose or sucrose. It does not cause combination of phosphate with the unfermented sugars, nor does its action on the partially fermented sugars and phosphates proceed to evolution of CO_2. The soln. of synthesizing enzyme (phosphates) has its activity greatly increased by heating to 35–40° for 30 min., the increased activity being retained after cooling again to 20°. The activation by heat does not depend upon the destruction of an inhibiting substance, for no such substance could be demonstrated on adding unheated solns. to those previously activated by heat.

D. D. VAN SLYKE.

The Action of Bacillus coli and Intestinal Bacteria upon Carbohydrates. CH. ED. SCHMIDT. Univ. Lausanne. *Schweiz. Wochschr.*, **49**, 577–82, 596–603, 609–15, 626–31, 645–8.—The following general conclusions are reached: (1) *B. coli* in pure culture, of whatever origin, cause fermentation of sol. carbohydrates of the monosaccharide group. Dextrin also ferments under action of certain races of *B. coli*. (2) In a medium turning and remaining acid by such ferments, the latter stops at the end of 2 or 3 days, only part of the carbohydrate having disappeared. (3) Fermentation is favored by presence of substances, *e. g.*, $CaCO_3$ neutralizing acidity produced by *B. coli*; then all carbohydrate in dil. soln. disappears in short time. (4) Disaccharides also ferment by pure culture *B. coli*, lactose more easily and rapidly than saccharose. (5) Insol. carbohydrates, *e. g.*, starch, do not ferment by pure cult. *B. coli*, not even in presence of such ferments as pancreatin and pepsin. (6) The intestinal bacteria, more rapidly than pure cult. *B. coli*, produce very active fermentn. with all sol. or insol. carbohydrates. (7) Attempts to isolate the different races of Coli bacilli seem to diminish the fermentative power of the total of intestinal microbes, yet they contain other bacteria which actively cause fermentn. of carbohydrates. (8) Thus the intestinal flora is seen to be very active in phenomena of digestion and nutrition. A bibliography is added.

S. WALDBOTT.

The Origin of the Optically Active Valeric Acid of Protein Putrefaction. CARL NEUBERG. Berlin. *Biochem. Z.*, **37**, 501–6.—From 26 g. of *d*-isoleucine, synthesized by the method of Loquin and submitted to putrefaction, 5.12 g. of *d*-valerianic acid and 1.82 g. of *d*-caproic acid (*d*-β,β_1-methylethylpropionic acid) were obtained.

D. D. VAN SLYKE.

Is *d*-Ornithine Racemicized by Putrefaction? CARL NEUBERG. Berlin. *Biochem. Z.*, **37**, 507–9.—*d*-Ornithine was submitted to putrefaction, at the end of which 30% of the substance was regained, with its optical activity undiminished. The racemization of *d*-ornithine observed by Ackermann (*C. A.*, **2**, 1293) must have resulted from the treatment of the ornithine in the process of isolation after the putrefaction.

D. D. VAN SLYKE.

Decomposition Powers of Bacteria in Water (SPÄT). 14. Ripening of Dates (VINSON), (FREEMAN). 12. New Paint-destroying Fungus (MASSEE). 26.

D. BOTANY.

CARL L. ALSBERG.

The Artificial Ripening of Persimmons. FRANCIS E. LLOYD. Alabama Polytech. Inst. Ala. State Dept. Agr., *Bull.* **42**, 42–9.—A critical review of the literature (cf. *C. A.*, **5**, 2268).

H. H. BARTLETT.

Experiments on the Processing of Persimmons to Render them Non-astringent. H. C. GORE. U. S. Dept. Agr., Bur. Chem., *Bull.* **141**, 31 pp. (5 figs., 3 plates).—Persimmons of various Japanese varieties may be processed by keeping the fruits in CO_2 for 3–5 days. The fruit remains firm, but becomes non-astringent. Lack of O re-

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tards the processes which result in softening. Native American persimmons (*Dioxyros virginiana*) failed to process successfully. By over-processing in CO_2, a large proportion of the persimmons became dark in color on subsequent softening. Chem. analyses of 5 varieties showed no relation between tannin content and ease of processing. H. H. BARTLETT.

Guayule (Parthenium argentatum, Gray), a Rubber Plant of the Chihuahua Desert. FRANCIS E. LLOYD. Alabama Polytech. Inst. *Carnegie Inst., Washington, Publn.* 139, Chap. 8. 213 pp., 46 plates,—A botanical and technological account of guayule, with a complete bibliography. L. summarizes Chapter 7, on the origin and occurrence of rubber, as follows: (1) Rubber appears in the root earlier than in the stem, and is first secreted in the primary canal cells. (2) Accumulation in the root usually takes place in the oldest cells first, and (at least in irrigated plants) is more rapid in the parenchyma-ray cells than in either the pith or the cortex. (3) Except in the hypocotyl, the accumulation of rubber in the stem takes place earlier in the pith than in the parenchyma-rays or cortex, and earlier in the rays than in the cortex. (4) With questionable exceptions, the accumulation of rubber is earlier in the "secreting-cells" of the resin canals than in the surrounding tissues. (5) The amt. of rubber in the cells of small seedlings in the field is generally relatively as great, or very nearly so, as in mature plants. (6) Vol. for vol., the bark contains less rubber than the contingent living cortex. (7) Rubber occurs in the pseudotylose tissue of the resin canals in quantities comparable to the amt. found in adjacent cells. (8) The march of the secretion of rubber is from the base toward the tip of new shoots and from the pith and cortex toward the cambium in older stems. (9) In desert plants the accumulation of rubber is more rapid than in irrigated plants. (10) The rate at which rubber is secreted by irrigated plants is such that at the close of the second season's growth the amt. is sufficient to agglomerate into large masses like those which are typically formed during the mechanical process for extraction of rubber from the wild desert plants. Although the amt. of rubber is lower in cultivated than in desert plants, the rate of growth under irrigation is enormously in excess of that under desert conditions. (11) There appears to be no direct physiological relation between the secretion of rubber and of resin. (12) Rubber appears to have no physiological function in the guayule plant. H. H. BARTLETT.

Photochemical Synthesis of Carbohydrates in Absence of Chlorophyll. J. STOKLASA AND V. ZDOBNICKY. *Bull. assoc. chim. sucr. dist.*, 29, 26–31; cf. *C. A.*, 5, 1796, 1918.—The synthesis of sugar from $KHCO_3$, in the moment of formation, and nascent H, was observed for the first time. The authors apply their results to the question of assimilation in the plant; it is possible that it is not the CO_2 which is reduced by the nascent H in the chlorophyll cell, but that it is the $KHCO_3$ in the moment of formation which is reduced. The HCHO formed is condensed to carbohydrate in presence of KOH. WM. E. CROSS.

The Lesser Writings of C. Clusius (CHRIST). 17.

E. NUTRITION.

P. B. HAWK.

NORMAL.

Intrapulmonary Utilization of Oxygen in Man. AUGUST PÜTTER. Bonn. *Z. klin. Med.*, 73, 342–56.—Discussion. M. S. F.

Law of the Expenditure Following Work. J. AMAR. *Compt. rend.*, 151, 952–4; *C. A.*, 6, 103.—Using a bicycle ergometer, the rate of recovery after exercize and the respiratory exchange were detd. The O consumpton is taken as an index of the

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body expenditure. The changes after work did not follow Newton's law for cooling bodies. WM. P. GARRETY.

Creatinine Metabolism. C. VOEGTLIN AND C. B. TOWLES. *Proc. Am. Soc. Biol. Chem.*, 2, 5, 6; through *J. Biol. Chem.*, 9, 11, 12.—The contention that the liver is an important factor in creatinine metabolism, was not confirmed by the results of expts. on dogs and birds. WM. P. GARRETY.

Quantitative Aspects of Nutrition. H. C. SHERMAN. N. Y. Teachers' Col., *Bull.* [2] 15.—A discussion of the factors affecting food requirements, and of characteristics of different nutrients including mineral constituents, with especial reference to quant. relations. WM. P. GARRETY.

The Digestibility of Vegetables in Health and Disease and the Effect of the Stomach in Disintegrating Vegetable Materials. A. SCHMIDT. *Deut. med. Wochschr.*, 37, 435–8; through *J. Am. Med Assoc.*, 56, 1154.—From his own and other investigations, S. concludes that in the digestion of raw and cooked vegetables, pepsin-HCl after a time causes softening and swelling of the substances, which are then acted upon by gastric juice. No evidence was found for the belief that digestion of vegetables occurs principally in the intestin, and that it results from bacterial action.

WM. P. GARRETY.

The Digestibility of Connective Tissue. R. BAUMSTARK AND O. COHNHEIM. *Z. Physiol. Chem.*, 65, 477–82.—In animal expts., connective tissue was found to be completely digested by pepsin. Raw connective tissue is digested only by pepsin with HCl, although the process may take place in the intestins. WM. P. GARRETY.

The Synthesis of Fatty Acids in the Body. O. SORGES. *Ergebnisse Physiol.*, 10, 1–46.—A summary of data relating to the oxidation of satd. and unsatd. fatty acids, the relationship between the constitution of a fatty acid and its utilization by the body, and the combustion of fatty acids in relation to the utilization of nutrients.

WM. P. GARRETY.

The Synthesis of Fat in Body Cells and the Question of the Relationship of its Composition to Fat in Food. E. ABDERHALDEN AND C. BRAHM. *Z. physiol. Chem.*, 65, 330–5.—Fat deposited after feeding large amts. of mutton tallow or rapeseed oil gave the reaction of the fat fed. This was not the case with the cell fat sepd. from the deposited fat by digestion with gastric juice or with dil. HCl.

WM. P. GARRETY.

The Nutritive Value of the Non-protein of Feeding Stuffs. H. P. ARMSBY. U. S. Dept. Agr., Bur. Anim. Ind., *Bull.* 139.—Most of the non-protein of vegetable substances, consisting of amino acids and amides, is katabolized, N appearing in urin, but it cannot replace protein, in carnivora and omnivora. Microörganisms of the digestive tract in ruminants convert non-protein into protein, this conversion being greater with NH_4 salts and asparagine than with vegetable exts. Protein so formed is digested. Indigestible protein sometimes observed is the result of sp. action of the exts. on the digestive tract, causing an increase of metabolic products in the feces. By conversion into bacterial protein, non-protein may serve for maintenance, for production of milk, and probably for growth, in protein-poor rations. The extent of the conversion is the measure of the availability of the non-proteins, and they are much inferior to the proteins. Attention is called to recent investigations of the possibility of utilizing NH_3 as a source of protein. WM. P. GARRETY.

The Perils of Low Protein Diets. A. BROADBENT. *Veg. Messenger Health Rev.*, 8, 82.—Observation of vegetarians through a long period seems to show that low protein diets are unfavorable to longevity. WM. P. GARRETY.

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The Influence of the Extract of Turnips and Dried Potato Chips on the Fat Content of Milk. A. MORGEN, C. BEGER AND WESTHAUSSER. *Landw. Vers. Stat.*, 75, 349–56.—The ext. from turnips and dried potato chips, when fed to animals, apparently did not exert any influence on the fat content of the milk. E. C. LATHROP.

Utilization by Ruminants of the Phosphorus Compounds of Feeding Stuffs. GUSTAV FINGERLING. Kgl. Versuchsstation, Hohenheim. *Biochem. Z.*, 37, 265–71.—The expts. were performed with growing lambs and with milch goats, the P fed being less than that required by the animals. Only 50–60% of the P of coarse food (hay) was utilized. This does not appear to be due to the inability of the animals to utilize the P in the forms present, for when Na_2HPO_4, lecithin, phytin, nuclein, or Na nucleate are added to a P-poor ration, about 90% of the added P is absorbed in each case. The non-utilizability of the P of hay appears due, not to the chem. combination of the P, but to the fact that it is enclosed by hard, difficultly digestible crude fiber, which affords a physical obstacle to the soln. and absorption of the P. The P of freshly cut green grass was 91% utilized; that from hay made from the same grass, however, only 53.4%. D. D. VAN SLYKE.

The Influence of Sugar on the Intestinal Flora of Children. E. HARTJE. St. Petersburg. *Jahrb. Kinderheilk.*, 73, 557–65.—Two children were fed on a cream-milk-water mixt., to which at diff. times were added sucrose, lactose, and malt ext. to bring the total sugar conc. to 7%. It was desired to simulate human milk. One l. of the mixt. contained 200 g. cream (15% fat), 100 g. cow's milk, 700 g. H_2O, and 56 g. sugar. In every instance sugar was detected in the feces; most after the malt ext. feeding and least after sucrose. Malt ext. yielded the largest amt. of dry feces and lactose the least. Sucrose gave rise to dry alkaline stools while soft acid or neutral feces resulted from the feeding of the other sugars. Sugar favors the growth of acidophile bacteria, especially when present in 6–7 times as great a conc. as the protein. Lactose and malt ext. yield almost pure cultures of acidophile bacteria, while under the influence of sucrose there is a more varied flora. M. S. FINE.

Nitrogen Partition in Feces. H. LABBÉ. *Compt. rend.*, 151, 822–4.—Of the total N, 45.25% was found sol. The proportion of sol. N obtained with different solvents is considered. WM. P. GARRETY.

ABNORMAL.

Metabolism in Artificial Hyperthyroidism. E. MAYERLE. Univ. Berlin. *Z. klin. Med.*, 71, 71–90.—M. administered thyroid tablets to dogs. The nature of the N balance and loss or gain in wt. depend upon the amt. of protein, carbohydrate and fat in the diet. M. S. F.

Experimental Studies on Fatigued Kidneys. LUIGI D'AMATO AND VINCENZO FAGGELLA. Inst. med. Klinik., Univ. Neapel. *Z. klin. Med.*, 72, 474–95.—The elimination of N, Cl and H_2O was studied in rabbits under the influence of administrations of urea (1.6–11.5 g.); NaCl (3–5 g.); and H_2O (200–500 cc.). The authors conclude that the healthy kidney of the rabbit is better able to free the body from an excess of Cl and H_2O than urea. When the kidneys are overworked their excreting powers undergo great fluctuations. In the nephritic kidney a similarly varying activity is displayed. M. S. F.

Alterations in the Composition of the Mineral Matter of the Bodies of Infants in Cases of Acute and Chronic Loss of Weight. L. TOBLER. Univ. Kinderklinik, Heidelberg. *Jahrb. Kinderheilk.*, 73, 566–85.—Analytical data are presented and discussed. M. S. F.

Total Metabolism of an Artificially Nourished Infant, Including the Respiratory Metabolism. IV. ALBERT NIEMANN. Univ. Kinderklinik, Berlin. *Jahrb. Kinder-*

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heilk., 74, 650–83.—An expt. is described, in which an infant was fed on whole milk (cow's). For details see the previous papers of this series by N (*C. A.*, 5, 934). Positive N and C, and negative H_2O balances were obtained. The negative H_2O balances in this and in the previous expts. are discussed. M. S. F.

The Use of Rice Bran in the Prevention and Cure of Beri-beri. L. BREAUDAT AND DENIER. *Ann. inst. Pasteur*, 25 167–89.—Statistical, experimental, and analytical data are presented. Prevention and cure resulted from the administration of 40 g. of rice bran per day. An extensive bibliography is given. WM. P. GARRETY.

Fat Transportation in Phosphorus Poisoning with Reference to the Source of Fat in the Animal Organism. NAGAMICHI SHIBATA. Med.-chem. Inst., Univ. Tokio. *Biochem. Z.*, 37 345–98.—The N and fat contents of the livers and remainder of the bodies were detd. in mice which were: (1) Normal, (2) starved, (3) starved and poisoned with P, (4) fed with bread and poisoned with P. All the fat detns. were done by the Kumagawa-Suto method. Some of the expts. were also performed on frogs. The evidence was entirely against the supposition that fat is formed from body protein. The fat, found in the liver of fasting mice after P poisoning, is transported to it from the subcutaneous fat depots. This is shown by the fact that the increase of fat in the liver is accompanied by a great decrease in the fat of the remainder of the body. It is further indicated by the fact that cod liver oil, injected subcutaneously, in P-poisoned mice is promptly transported to the liver, where it can be recognized by its high I no. Oil similarly injected in mice which were fasting but not poisoned was not absorbed to an appreciable extent. The loss of total fat in the fasting, P-poisoned mouse is somewhat less (35–50%) than that in the unpoisoned, fasting mouse (50%). When P-poisoned mice were fed with bread the loss of fat was much *greater* (84%) than when they were starved. The carbohydrate stimulates the combustion of fats. In this case also a transfer of body fat to the liver occurs, as evidenced by the fact that, while even the liver fat decreases somewhat, the ratio of liver fat to total fat increases 4.5-fold. In the fasting, P-poisoned animals, both frogs and mice, a loss of body N occurred, but no greater than was occasioned by fasting alone. In the expts. with cod liver oil S. incidentally discovered that the typical color reaction with conc. H_2SO_4 is not due to the oil itself, but to a lipochrome which is present as an impurity and is difficult to sep. from the oil. In explanation of the heaping up of fat in the liver of fasting P-poisoned mice, the hypothesis is advanced that the fat is transported to the liver in order to be burned to supply the energy requirement of the fasting organism. Its combustion, however, is delayed because of the injury to the liver caused by the P, and the transported fat consequently accumulates there. The remarkable consumption of fat by P-poisoned animals fed on bread may be due to depression of the adrenaline production, which may have the function of limiting body combustions to a normal rate. D. D. VAN SLYKE.

The Energy Equivalents of the Work of Digestion in Ruminants (Sheep). W. USTJANZEW. Land- u. Forstwirtschaftliches Inst., Nova-Alexandra. *Biochem. Z.*, 37, 457–76.—The energy consumption of sheep was measured by the Zuntz method of detg. the gas exchange. The energy of active chewing was found to be 13.4 cal. per min. per kg. of body wt. The energy consumption of chewing the cud was 3.92 cal. per min. per kg. body wt. These figures represent the increase above resting energy consumption observed while the animal was eating or chewing the cud. For the entire digestion of 1 kg. of hay cellulose the total consumption of energy is 0.84 cal. Of this 0.31 cal. is used for chewing and ruminating, leaving 0.54 cal. for the energy consumption of the internal digestive organs. The energy required for the digestion of a given amt. of coarse food (hay) is much greater than that for the same amt. of more conc. food (oats). The energy consumption per min. for chewing is the

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same in each case, but the coarse food requires a much longer time and consequently a greater consumption of total energy. The internal work of digestion requires an energy consumption both more rapid and of longer duration in the disposal of coarse food than in that of the conc. food. A given grass has the same total effect on the intensity of the digestive processes whether fed green or dried. The sheep (ruminant) uses less energy than the horse in digesting coarse food. D. D. VAN SLYKE.

The Role of Hypophysis in Nutrition. F. DUNAN. *Presse med* (*Paris*), 1911, 312–4.—Hypophysis in rabbits produced rapid loss in wt., increased blood pressure, lower N elimination, and glucosuria. WM. P. GARRETY.

The Work of Digestion and Pavlov's Investigations. M. GRECHEN. *Inst. Luxembourg, Sect. Sci. Nat. Arch. Trimest.*, (*n. ser.*), 4.—Data are given of results of experimental studies by Pavlov's methods. WM. P. GARRETY.

Influence of Under-feeding on the Blood. A. E. BOYCOTT AND R. A. CHRISOLM. Guy's Hosp., Lond. *J. Path. Bact.*, 16, 263–8.—Under-feeding with a protein-poor diet does not necessarily cause any wasting of the blood. J. H. MITCHELL.

The Presence of Lactic Acid in Human Blood. H. FRIES. Inst. Städt. Krankenhaus, Frankfurt. *Biochem. Z.*, 35, 368–85.—Small amts of lactic acid are often a normal constituent of normal human blood. In fever there is no marked increase of lactic acid and its presence gives no clue to the existence of abnormal metabolism. Following excessive muscular work there is an increase in lactic acid in the blood. Post-mortem blood is richer in lactic acid than the normal. Human blood allowed to stand at 40° for 2 hrs. showed decided increase in lactic acid. The nature of the substance that yields lactic acid in the blood could not be detd. G. M. MEYER.

The Influence of Natural Arsenic Water and Artificial Solutions of Arsenic upon Metabolism. SEVERINO CROCE. I. med. Klinik d. Kgl. Charité, Berlin. *Z. klin. Med.*, 73, 103–15.—The administration of natural As water (Val Sinestra) and Fowler's soln. to young rats induced greater growth than occurred in control animals, the influence of the former in this respect being the more marked. The same result obtained whether the rats were fed on a const. diet or fed *ad libitum*, although the effect in the former case was somewhat less pronounced. Inhibition of metabolism is offered as a possible explanation for the accelerated growth under the influence of As.

M. S. F.

F. PHYSIOLOGY.

ANDREW HUNTER.

The Nature of the Chemical Combinations of Potassium in the Tissue. W. KOCH AND C. C. TODD. *Proc. Am. Soc. Biol. Chem.*, 1910; through *J. Biol. Chem.*, 9, xv–xvi.—"Such Na and K phosphatide compounds exist in all the tissues of the body and are probably of much more importance than the hitherto assumed ion protein combinations." WM. P. GARRETY.

Chemical Studies of Human Sweat. L. W. RIGGS. *Proc. Am. Soc. Biol. Chem.*, 1910; through *J. Biol. Chem.*, 9, xix.—Analyses of 45 samples from healthy and nephritic persons are given. In most of the samples, total N, N as urea + NH_3, inorganic solids, K, and Cl were detd. WM. P. GARRETY.

Conditions which Favor the Precipitation or Solution of Uric Acid in the Urin. F. CAPPON. Fac. Méd. Lille; Lab. chim. biol. *Compt. rend. soc. biol.*, 71, 433–5.—The extent to which alk. spring H_2O retards the pptn. of uric acid in the urin is discussed. I. K. PHELPS.

Composition of Normal Urin of Man. A. BOUCHEZ AND E. LAMBLING. *Compt. rend. soc. biol.*, 71, 435–8.—From a large number of analyses of urin it is shown that the content of urea, undetd. organic matter, creatinine, NH_3, uric acid and other purines

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depends on the amt. and kind of food ingested. The ingestion of N in food other than milk produces in the urin a larger amt. of undetd. organic matter than does an equal wt. of N in the form of milk. *Ibid.*, 486–8.—Further work showing the distribution of N in the urin of subjects fed on milk diet, on mixed diet with much meat, and on ordinary mixed diet. Results are shown for the milk diet and for the ordinary mixed diet. On milk diet the undetd. organic N is here so small that it is almost no greater than the ordinary error of the process. N as urea is the highest ever found. Urea and NH_3 contain 95.6% of all N in the urin. The quantity of urea on mixed diet varies greatest from that on milk diet, amounting to almost 10%. The quantity of creatinine and the amt. of undetd. organic N is about twice what it is on milk diet. I. K. PHELPS.

Variations in the Refraction and Viscosity of the Blood of Infants. J. RUSZ. Budapest. *Orvosi hetilap.*, **55**, 351–5; through *Zentr. Biochem. Biophys.*, **12**, 76.—The mean values for 100 infants varying in age from 3 hrs.–14 mos. showed an increase in the viscosity of the blood during the first days after birth, the value falling later very rapidly and continuing to fall during the first year. The refraction of the plasma also increases during the first days, falling considerably between the 4–8th day, and increasing then up to the end of 1 yr. Both values fall slightly during the daytime. The taking of food produces a decrease of both values in a healthy thriving infant and the converse in a sickly under-developed infant. I. K. PHELPS.

Spleen Enzymes. TAMIO TANAKA. Rudolph Virchow Krankenhaus, Berlin. *Biochem. Z.*, **37**, 249–61.—The dried and powdered spleen of the pig contains catalase, oxidase, diastase capable of hydrolyzing both starch and dextrin, inulase, invertase, lipase, urease, and enzymes of the types of trypsin, erepsin and pepsin. Lactase, deaminase and glucolytic enzymes could not be demonstrated. D. D. VAN SLYKE.

Comparative Histological and Chemical Investigation of the Fat Contents of the Inner Organs. NAGAMICHI SHIBATA AND SHIGEKIYO ENDO. Med.-chem. and Path. Inst., Univ. Tokio. *Biochem. Z.*, **37**, 399–409.—The organs (33 kidneys and 27 livers from autopsies) were analyzed for fat chemically by the Kumagawa-Suto method and histologically with the aid of the stains, Sudan III, scarlet-red, neutral red, osmic acid, Nile blue sulfate, and with the polarization microscope. With 1 exception, a nephritic kidney, the organs which showed a high fat content on analysis also appeared rich in fat when examd. under the microscope, the histological and chem. results running parallel throughout. Results by previous investigators, who classed all the ether extractives as fats had led to the conclusion that the amt. of histologically demonstrable fat bears no relation to that actually present. The application of the more reliable Kumagawa-Suto method shows that this conclusion is unjustified.
D. D. VAN SLYKE.

The Occurrence of some Organic Bases in the Flesh of the Wild Rabbit. KIYOHISHA YOSHIMURA. Halle a/S. *Biochem. Z.*, **37**, 477–81.—The following amts. of the bases were found per kg. of fresh muscle: Creatine, 2.00 g.; hypoxanthine, 0.04 g.; xanthine, present; carnosine, 2.23 g. D. D. VAN SLYKE.

Consumption of Carbohydrates and the Production of Carbon Dioxide in the Isolated Heart. Univ. Turin, Italy. *Z. allgem. Physiol.*, **13**, 1–34.—The consumption of dextrose and the formation of CO_2 in perfused rabbit hearts bears no relation to the work performed by the heart. The duration of the expt. influences these values. When calc. to a unit of time higher values are obtained if the expt. is prolonged, the amt. of work regulated by suitable levers and wts. remain const. The CO_2 formed is about $^1/_2$ of the utilized dextrose (1 mol. dextrose yields 2 mols. CO_2). Therefore only $^1/_2$ of the dextrose is completely oxidized. When large amts. of dextrose were used

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even this value could not be reached, whereas when smaller quantities of dextrose are used higher values are obtained. CO_2 formation is a function of dextrose consumption. A relation between mechanical energy and the energy equiv. from the oxidation of dextrose could not be detd. The duration of the expt. influences the intensity of the oxidation. A heart which has been pulsating for a considerable time is still capable of consuming large amts. of dextrose, but only oxidizes it to a small degree. Ringer-Locke soln. which has been perfusing the heart for some time contains small amts. of a N substance probably of protein nature. The excized living rabbit heart consumes only minimal amts. of its own glycogen. G. M. MEYER.

Composition of Human Milk (SCHLOSS). 12.

G. PATHOLOGY.

H. GIDEON WELLS.

Modifications of the Complement in the Course of Clinical and Experimental Fevers. V. SABASTIANI. *Arch. farm. sper.*, 12, 458–78.—During febril hyperthermia, whether caused by infection or by steril toxin, the complement is lowered. The mechanism of fever is hardly to be regarded as anaphylactic, since this lowering of the complement does not necessarily indicate immunization. A. W. DOX.

Contributions to the Etiology of Paroxysmal Hemoglobinuria. LUDWIG FEJES. Budapest. *Z. klin. Med.*, 72, 377-82.—Horses given 5 doses of washed corpuscles from 1 l. of their own blood at intervals of 6 days, and then given 4 hrs. of hard work or infected with *Trypanosoma equiperdum*, failed to develop symptoms of paroxysmal hemoglobinuria. After the work, or after the infection the hemolytic power of the serum for its own red cells and for those of normal horses was greatly increased. The red cells of horses thus treated showed increased resistance to saponin and staphylohemolysin. The expts. were adequately controlled. M. S. FINE.

Functional Diagnosis of the Liver. WALTER FREY. Med. Klinik, Basel. *Z. klin. Med.*, 72, 383–435—Urobilinuria frequently accompanies disturbances of the liver, but is indicative of a functionally injured organ only when there can be excluded a diminished elimination of urobilin in the feces and an increase of this substance in blood (disintegration of red blood cells). Levulose is of aid in recognizing liver affections. Galactose is less suitable. Alimentary levulosuria was present in 10% of normal cases and in 50% of patients with liver disturbances, especially cirrhosis. The excretion of urea was of no special significance in this connection. The NH_3 values were high in diseases of the liver, but the diagnostic importance of this is diminished because of similar findings in other conditions. The amino acid N of the urin was increased (over 0.5 g.) in cirrhosis, such being obtained practically in only this type of liver disease. Glycocoll, alanine, and aspartic acid were practically as well utilized in diseased conditions of the liver as normally. F. appends an extensive bibliography. M. S. FINE.

The Influence of Proteins upon Lipoid Hemolysis. JULIUS KENTZLER. Budapest. *Z. klin. Med.*, 72, 436–43.—Ovolecithin (Merck) itself hemolyzes erythrocytes. This hemolytic action can be inhibited by serum, the active principle in this respect being seralbumin. When denatured or diluted, seralbumin cannot prevent hemolysis. The inhibition of hemolysis by serum is not influenced by heating to 56°.

M. S. FINE.

Studies on the Antitryptic Power of Diabetic Blood. EMIL NEISSER AND HARRY KOENIGSFELD. Breslau. *Z. klin. Med.*, 72, 444–62.—The decreased antitryptic power of the blood of diabetics can be demonstrated *in vitro;* and is perhaps due to an increased tryptic activity induced by the increased sugar conc. of the blood. A comprehensive bibliography is appended. M. S. F.

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Experimental Coma. I. Symptomology, Excretion of Acetone Substances and Dose Accompanying Diminished Body Weight. R. EHRMANN AND P. ESSER. Med.-poliklin. Inst., Univ. Berlin. *Z. klin. Med.*, **72**, 496–9.—Na butyrate, in doses of 3.2–3.6 g. per kg. body wt., induced coma in rabbits. After intravenous administrations of this compd., the liver, blood and urin contained no *l*-β-hydroxybutyric acid and relatively insignificant amts. of acetoacetic acid and acetone. Similar results were obtained when the dose was given by means of a stomach sound. Butyric acid is a sp. poison for the central nervous system, and coma is a sp. fatty-acid poisoning. M. S. F.

Experimental Coma. II. Relation of the Sodium Salts of Butyric and Isobutyric Acids. R. EHRMANN. Med.-poliklin. Inst., Univ. Berlin. *Z. klin. Med.*, **72**, 500–1.—About twice as great a dose of Na isobutyrate as of Na butyrate was required to induce coma. M. S. F.

Experimental Coma. III. Carbon Dioxide Content and Alkalinity of the Blood. A. LOEWY AND R. EHRMANN. *Z. klin. Med.*, **72**, 502–4.—Normal values for the CO_2 conc. in the blood (34.26–39.84 vol. %) were obtained after administrations of Na butyrate in doses insufficient to induce coma. When coma ensued, lower values were found (17.1–29.0 vol. %). In 2 out of 3 expts. with Na isobutyrate where coma did not develop, the vol. % of CO_2 was 18.8–22. This indicates that the diminished alkalinity of the blood cannot be the cause of coma. M. S. F.

Serum Diagnosis of Pregnancy. EUGEN ROSENTHAL. Univ. Budapest. *Z. klin. Med.*, **72**, 505–18.—Pregnancy in healthy women is accompanied by increased antiproteolytic power of the serum. M. S. F.

The Clinical Value of Serological Methods of Investigation in Tuberculosis. HERMANN LÜDKE AND FRITZ FISCHER. Med. Klinik, Würzburg. *Z. klin. Med.*, **72**, 545–54. M. S. F.

Functional Diagnosis of the Liver. FRITZ FALK AND PAUL SAXL. I. med. Klinik, Wien. *Z. klin. Med.*, **72**, 131–40.—Diseases of the liver (especially cirrhosis) are accompanied by relatively high excretion of amino acid- and peptide-N in the urin, both types of N substances being increased by the feeding of glycocoll. M. S. F.

Physico-chemical Changes in the Blood after Para- and Thoracentesis. Contribution to the Dynamics of Transudates. AMERIGO BARLOCCO. Med. Klinik, Univ. Genoa. *Z. klin. Med.*, **73**, 278–88.—The detns. included sp. gr., f. p., viscosity, *n*, surface tension and elec. resistance. These detns. were made at varying periods before and after paracentesis. M. S. F.

Physico-chemical Changes in the Blood after Bleeding and Subcutaneous Infusions. C. OLIVA. Med. Klinik, Univ. Genoa. *Z. klin. Med.*, **73**, 289–97.—Tables are given comparing the physico-chem. properties of the blood after bleeding, after subcutaneous infusion, and after bleeding followed by subcutaneous infusion. The detns. included sp. gr., f. p., viscosity, *n*, surface tension and elec. cond. M. S. F.

Observations on the Excretion of Urin and Salt in Diabetes Insipidus. FORSCHBACH AND WEBER. Med. Kliniks of Breslau and Greifswald. *Z. klin. Med.*, **73**, 221–39.—The vol., sp. gr., and Cl were detd. in urin collected every 2 hrs. Tables are offered containing such data obtained when water was given *ad libitum*, when the water intake was restricted, with salt-poor and with salt-rich diets. M. S. F.

Functional Diagnosis of the Liver. II. Dissociated Disturbances of the Functions of the Liver. FRITZ FALK AND PAUL SAXL. I. med. Klinik, Wien. *Z. klin. Med.*, **73**, 325–41.—Disturbances of the liver are divided into 4 groups: (1) Those in which the hepatic cells are injured secondarily and mechanically, *e. g.*, carcinoma and sarcoma;

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(2) changes induced by poisons, *e. g.*, P, EtOH, bacterial toxins, etc.; (3) diseases due to disturbed excretion of bile; (4) cirrhosis. These groups are discussed as to proportion of urea-, NH_2-, amino-acid-, and peptide-N in the urin; the relative frequency of levulosuria and pathological urobilinuria. Cases of cirrhotic livers showed the greatest changes in N partition in the urin, urobilin excretion and tolerance toward levulose. M. S. F.

The Carbon Dioxide Tension in Blood in Pathological Conditions. O. PORGES, A. LEIMDORFER AND E. MARKOVICI. I. med. Klinik, Wien. *Z. klin. Med.*, 73, 389–427.—The method employed is described. The normal CO_2 tension was 5.5–7% of an atm., during starvation 5.5–6.5%, and during gastric digestion 6–7%. Values under 5.5 and over 7% are considered pathological. Moderate muscular work always increased the CO_2 tension, *e. g.*, to as much as 7.95% of an atm. The lowered CO_2 tension accompanying many cases of diabetes was raised by the administration of alkali. This decreased tension in diabetes must have been due to the accumulation of acids. The increase of acid radicals in the blood stimulates respiration to increased activity, leading to compensating lowering of the CO_2 tension and thus of the acid radicals. The detn. of the CO_2 tension can be readily applied clinically and serves as a measure of acidosis. It offers several advantages over the chem. detn. of the acetone substances in the urin. M. S. F.

Modern Blood Tests before Transfusion. REUBEN OTTENBERG AND D. J. KALISKI. Pathol. Lab., Mt. Sinai Hospital, New York. *Biochem. Bull.*, 1, 5–6.—Transfusion should not be made from a donor whose blood, when mixed with that of the patient, produces either agglutination or hemolysis. Agglutination and hemolysis tests should be made in each case before transfusion is attempted. W. J. GIES.

Immunity of Guinea Pigs to Diphtheria Toxin and its Effect upon the Offspring. H. J. SÜDMERSEN AND A. T. GLENNY. Wellcome Lab., Lond. *J. Hyg.*, 11, 423–42.—The young of parents, both of which had been injected with an immunizing mixt. of diphtheria toxin and antitoxin, show immunity of the same order as that of the young injected mothers and normal fathers. The injection of certain foreign materials (*B. typhosus*) may have the same effect on diminishing the resistance of the offspring. A single injection of diphtheria toxin may give rise to active immunity in pigs possessing hereditary immunity. The degree of immunity is in indirect ratio to the degree of constitutional disturbance following injection. J. H. MITCHELL.

Antibactericidal Action of the Bile Salts. S. L. CUMMINS. *J. Hyg.*, 11, 373–80.—C. confirms previous work on the antibactericidal properties of Na taurocholate, and finds, further, that taurin, glycine, and Na glycocholate act similarly, but that cholic acid is without effect. The action was found to be upon the complement and not upon the amboceptor. J. H. M.

Physiological Effects of Uremic Blood. A. PI-SUNER AND J. ALOMAR. Barcelone. *Compt. rend. soc. biol.*, 71, 369–71. I. K. PHELPS.

Antihemolytic Power of Human Serum Relative to Saponin in its Relation to the Determination of the Amount of Cholesterolemia. L. BOIDIN AND CH. FLANDIN. *Compt. rend soc. biol.*, 71, 402–4.—Expts. with 22 human serums showed that if 2 g. or less of cholesterol is present with a given amt. of saponin hemolysis is produced at once. With $^1/_2$ that amt. hemolysis takes place in 5 min., and for smaller amts. correspondingly slower until with $^1/_8$ none occurs. Even at the end of $^1/_2$ of an hr. with 2 or more g. of cholesterol no hemolysis takes place. The red blood corpuscles of dog blood show even greater resistance. I. K. P.

Case of Levulosuria. S. STROUSE AND J. C. FRIEDMAN. Michael Reese Hosp., Chicago. *Trans. Chicago Path. Soc.*, 8, 206; through *Zentr. Biochem. Biophys.*, 12,

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72.—The urin of a 16-year old boy showed protein, cylinders, indican and levulose. The levulosuria disappeared after a carbohydrate-free diet. All sugars other than levulose were tolerated. An injection of phlorhizin produced a prompt excretion of glucose without any increase of the levulosuria. Thyreiodin, pituitrin and adrenaline had no influence on the levulosuria. I. K. P.

Changes in Coagulation Caused by Loss of Blood. HEINRICH STROMBERG. Univ. Freiburg. *Biochem. Z.*, **37**, 218–37.—Bleeding of rabbits resulted in marked decrease in the time requird by their blood to completely coagulate. The effect on the rates of coagulation was not proportional to the amt. of blood drawn. Sometimes removal of 10 cc. affected the coagulation more than did that of 50 cc. When a series of bleedings were made, the effects of those after the first were irregular, but the av. time of coagulation was shortened somewhat. D. D. VAN SLYKE.

The Hemolysin of Eel Serum. H. LIEFFMANN AND ANDREEW. Rudolf-Virchow Krankenhaus, Berlin. *Z. Immunität.*, **11**, 707–10.—This can be sepd. into 2 fractions, corresponding resp. to middle- and end-piece of complement, in globulin and albumin fractions of eel serum. No investigation as to presence of a substance similar to amboceptor was made. H. G. W.

Action of Cobra Venom on Complement. II. H. SACHS AND L. OMOROKOW. Königl. Inst. Exp. Therapie, Frankfurt a/M. *Z. Immunität.*, **11**, 710–24.—Guinea-pig serum deprived of its complement function by cobra venom can be quantitatively reactivated by either middle or end-piece. If cobra venom and similarly treated serum act together upon amboceptor corpuscles, they can be reactivated by middle-piece but not with end-piece. This peculiar suppression of both components of complement by cobra venom seems to have a general significance, which is discussed. H. G. W.

Conglutination of Mastic and Starch. O. GENGOU. Pasteur. Inst., Brabant. *Z. Immunität.*, **11**, 725–48.—Emulsions of gum mastic may be prepared which can be agglutinated by certain fresh sera, or by certain heated sera which have been reactivated with complement. This occurs without any change in the mastic emulsion comparable to the sensitization of bacteria or corpuscles. It is in agreement with the adsorption theory of alexin action. Starch granules may also be agglutinated by sera, but here the complement is bound after a preliminary change in the starch which corresponds to the action of immune sera upon bacteria and corpuscles. Probably this sensitization of the starch granules is not dependent upon pptn. of their proteins by the sera. On the agglutination of sensitized corpuscles only middle-piece is necessary in order to make them agglutinable by inactivated ox serum. H. G. W.

The Present Status of Studies with the Epiphanin Reaction. H. STÖTTER. Hyg.-bakt. Inst., Univ. Erlangen. *Z. Immunität.*, **11**, 749–59.—Criticism and refutation of Kammann's discussion of this method (*C. A.*, **5**, 3855). H. G. W.

Wassermann Reaction in Leprosy. A. M. LEVIN. *Russky Wratsch*, **1911**, 1307; through *Z. Immunität., Ref.* **4**, 700.—Positive with usual syphilis system in 45–50% of tubercular form, and 20–25% of nervous type. If exts. of lepromas are used as antigen the reaction is sp. for leprosy. Lepra sera lose their reactive properties very quickly and should be investigated while fresh. H. G. W.

Wassermann Reaction in Light of Ferment Theory of Immunity. W. J. GOSS. St. Petersburg. *Russky Wratsch*, **1911**, 1412, 1440; through *Z. Immunität., Ref.* **4**, 701.—G. suggests that the spirochetes destroy cells, the liberated proteins and lipoids causing antibodies to form; antibodies are also formed against the enzymes of the spirochetes. These constitute the reactive substance of the W. reaction; hence, the variety of things that may be used as antigen. H. G. W.

Thyroid and Fermentative Processes. A. Y. YUSHTSHENKO. St. Petersburg.

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Russky Wratsch, 1911, 1402, 1436; through *Z. Immunität., Ref.* 4, 717.—Extirpation of thyroid of young dogs causes decrease of catalase and nuclease in blood and internal organs; less effect with rabbits, in which antitrypsin of serum is also reduced. Feeding of thyroid causes increase of catalase, nuclease, antitrypsin and hemolysins; philocatalase, however, decreases greatly. H. G. W.

Serologico-chemical Investigations of Urin. H. PRIBRAM. Med. Klin., Prague. *Fortschr. Med.*, 29, 951–2.—Normal human urin, alc.-pptd. urinary colloids and the sediment of nephritic urin were used for immunizing. All 3 were very toxic. In nephritis the amt. of alc.-pptd. colloid was reduced; hence it may be of importance in uremia. When injected intravenously it causes fall in blood pressure, perhaps by acting as hormone on the adrenals. It contains tyrosine groups, which may act as precursors of adrenaline. H. G. W.

Solubility of Bacteria in the Body. N. K. ROSENBERG. Tiraspol. *Russky Wratsch*, 1911, 1207; through *Z. Immunität., Ref.* 4, 674; cf. *C. A.*, 5, 1127.—Bacteria are protected by membranes of cellulose, hemicellulose, waxes, or similar substances. By immunizing frogs with dissolved cellulose and hemicellulose and rabbits with beeswax R. obtained sera which dissolved the membranes of certain bacteria without having a bactericidal effect. Wax-immune rabbit serum when allowed to act upon tubercle bacilli for a sufficient time caused alterations which rendered them very susceptible to phagocytosis. H. G. W.

Action of Sera upon Isolated Rabbit Heart. S. I. ZLATOGOROV AND K. S. VILLANEN. *Russky Wratsch*, 1911, 1529; through *Z. Immunität., Ref.* 4, 676.—Normal and antitoxic horse sera are equally toxic to the isolated heart, sometimes so much so as to stop action when used for perfusion. Long preservation in closed or open vessels, and a single heating to 56–8° does not decrease the toxicity. The cause of this toxicity is not known. H. G. W.

The Technic of Blood Coagulation and the Nature of the Coagulation Process. HEINRICH STROMBERG. Univ. Freiberg. *Biochem. Z.*, 37, 177–218.—Usually thrombin which acts in the shortest time can also coagulate in the greatest diln. As this is not always the case, however, S. has followed the coagulation process by both the time method and the quant. diln. method of Wolgemuth for thrombin detn. (*C. A.*, 4, 2002). In some concs. the coagulation follows the time rule of Fuld for enzyme actions, in others the rule of Schuetz, and again neither. Results of other authors, indicating that the thrombin can be completely exhausted or bound by reacting with sufficiently large amts. of fibrinogen, are confirmed. Increase of temp. from 30 to 40° causes no acceleration in the coagulation of fibrinogen by thrombin *in vitro*. S. concludes that thrombin does not act as an enzyme (cf. Howell, *C. A.*, 4, 3249). D. D. VAN SLYKE.

Influence of Glucose on the Vitality of Trypanosoma lewisi in Vitro. C. BIOT, R. BIOT AND G. RICHARD. *Compt. rend. soc. biol.*, 71, 368–9.—Small flasks containing citrated serum infested with *T. lewisi* were sealed with wax or paraffin and allowed to stand at room temp. Other flasks prepared in the same way contained small amts. of glucose also. The *T. lewisi* lived 4 or 5 d. in the flasks without glucose and 10, 12, or 15 d. in the flasks containing glucose, showing that glucose had prolonged the life of the trypanosomes. This is corroborated by the observations of the length of life of *T. lewisi* in the portal and hepatic systems of dead rats. I. K. PHELPS.

H. PHARMACOLOGY.

ALFRED N. RICHARDS.

Pharmacological Action of the Fresh Juice of Viscum album. E. A. FUBINI AND LEOPOLDINA ANTONINI. *Arch. farm. sper.*, 12, 450–7.—The juice of *Viscum album*,

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administered intravenously, produces a rapid lowering of blood pressure and retards respiration. A. W. Dox.

Glucosuria and Fatty Stools in Basedow's Disease; Likewise a Contribution on the Treatment of this Disease by means of the Röntgen Ray. W. Falta. I. med. Univ.-Klinik, Wien. *Z. klin. Med.*, **71**, 1–22.—Nine cases were treated by the Röntgen ray therapy. The treatment checked the accompanying glucosuria in 4 cases, *i. e.*, those in which the glucosuria was of thyroid origin and uncomplicated with true diabetes mellitus. In these cases, also, the levulosuria, which could be induced, and the poor fat absorption observed previous to the treatment, similarly disappeared. The relation of the thyroid to the pancreas is discussed. M. S. Fine.

Mutual Relation of the Glands Furnishing Internal Secretions. III. Chemotaxis. Giovanni Bertelli, W. Falta and Otto Schweeger. I. med. Univ.-Klinik, Wien. *Z. klin. Med.*, **71**, 23–70.—The change in the blood picture was studied after the administration of adrenaline, ergotoxin, atropine, choline, pilocarpine, $NaNO_2$ and exts. of the pituitary bodies. Adrenaline induced a general increase in the no. of erythrocytes, with only a slight increase in hemoglobin. The effect of pituitary exts. was similar but less pronounced; ergotoxin showed no striking influence. The alterations in the leucocytic count were far from const.; nevertheless, the following general deductions could be made: Adrenaline and atropine induced a preponderance of neutrophils in the peripheral blood, from which the eosinophils disappeared and collected in the liver. After several hrs. there was a general increase in neutrophils and decrease in eosinophils. This neutrophil-aneosinophil hyperleucocytosis lasted for some time. After several days, the eosinophils increased and later also the mononuclear cells. Pilocarpine, choline, $NaNO_2$ and pituitary exts. induced a preponderance of lymphocytes and large mononuclear cells in the peripheral blood, and of neutrophils in the organs. Later there followed hyperleucocytosis with increased no. of neutrophils and decreased no. of eosinophils in the blood of the periphery and organs. Similar blood pictures may be observed in a variety of diseases. The possible bearing of blood changes of the above nature upon certain aspects of metabolism is discussed.

M. S. F.

The Resistance to Poisons of Known Chemical Constitution. P. Fleischmann. I. med. Klinik, Berlin. *Z. klin. Med.*, **73**, 175–88.—The expts. of F. were based upon his previously made observation (*C. A.*, **4**, 3245) that goitrous rabbits are more sensitive to atropine than animals with normal thyroids. Normally 0.001–0.01 g. intravenously injected atropine in rabbits paralyzes the vagus for only a few minutes, while the same dose in goitrous animals destroys its sensitiveness for hrs. The different reactions of individuals to the same dose of atropine was found to be independent of body wt. Repeated injections of the same dose into the same animal had practically a const. effect. The intensity of the action was not in proportion to the dose. Atropine is inactivated by the blood. Relatively large amts. of atropine treated with rabbit serum lost their toxicity for mice. The blood of goitrous rabbits lacks the inactivating power. Testing for atropine by means of the muscarinized heart was found to be much more reliable than by vagus paralysis. By the former method, 0.00001 mg. could be detected; by the latter but 0.3 mg. Employing the muscarine method, 1 cc. of rabbit serum completely inactivated 0.1 mg. of atropine. Only guinea-pig serum approached that of rabbits in its detoxicating ability, which is in accord with the fact that these animals are especially resistant to atropine. Normal human serum and the sera of the dog, cat, calf and hen showed very little or no detoxicating power. Cats and dogs are very sensitive to atropine. The serum from patients with exophthalmic goiter showed greater detoxicating action than other serum, although this was slight compared to that of the rabbit serum. Thyroid substance cannot inactivate

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atropine and thyroidectomy does not alter the detoxicating power of the blood. F. attempted to isolate the inactivating principle from the blood. The EtOH-Et_2O ext. was without effect. The salt-free serum was just as effective as the untreated.
M. S. F.

The Content of Radium Emanation in the Blood of the Living after Different Therapeutic Forms of Administration. F. GUDZENT. I. med. Klinik, Berlin. *Z. klin. Med.*, **73**, 298–307.—The Em. absorbed into the blood from the alimentary canal or directly introduced into the blood was excreted comparatively rapidly, so that 2–4 hrs. after the administration, the Em. could no longer be detected in the blood. Inhaling Em. in a closed room enriched the Em. conc. of the blood, *e. g.*, in 1000 g. of blood after 15 min. there was about as much as in a l. of air; after 2 hrs., 4–5 times as much; and after 3 hrs., 6–7 times as much. The reason for this accumulation of Em. in the blood is not yet clear.
M. S. F.

The Influence of Subcutaneously Injected Gelatin in Diseases of the Kidneys. I. B. STUDZINSKII. Med. Klinik der Univ. Kiev. *Z. klin. Med.*, **73**, 357–85.—Subcut. gelatin injections in the usual therapeutic doses had no effect on the vol. and sp. gr. of the urin. In chronic interstitial and chronic parenchymatous nephritis (without hemorrhage) the above doses caused no special injury. In kidney diseases with hematuria, the amt. of blood passed is increased by subcutaneous gelatin injections.
M. S. F.

Pharmacological Investigations upon some 2,5-Pyrines. KARL KOBERT. Univ. Rostock. *Z. exp. Path. Ther.*, **9**, 614–38.—Thiopyrine is without action on red blood cells *in vitro*. In frogs small doses increase reflex excitability; larger ones are followed by paralysis. In warm-blooded animals, symptoms of paralysis predominate. Selenopyrine is very similar in its action to thiopyrine. Aminopyrine hydrochloride is comparatively non-toxic, 2 g. being required to kill a dog weighing 12 kg. Anilopyrine hydrochloride is very poisonous, 5 mg. being fatal to frogs and 20 mg. fatal to rabbits. It produces symptoms of increased reflex excitability, followed by paralysis, but has very little if any toxic action on blood. 2,5-Methylphenylhydrazinopyrine hydrochloride in conc. of 1 : 200–1 : 3000 *in vitro* acts upon blood with formation of methemoglobin and cathemoglobin. It paralyzes the central nervous system of frogs, cats and rabbits. The blood of a fatally poisoned rabbit remained apparently normal. 2,5-Methylphenylhydrazinopyrine iodomethylate does not act on red blood cells, *in vitro*. It does not affect the central nervous system but causes a curare-like paralysis of the peripheral motor nerve endings. K. ascribes the blood-destroying action of the methylphenylhydrazinopyrine hydrochloride to the phenylhydrazine radical. This property is dependent upon the presence of a H atom in direct combination with a N atom. Fully substituted hydrazines, such as the iodomethylate, are not blood poisons. The pentavalent N in the hydrochloride does not possess the curare-like properties generally ascribed to compds. containing pentavalent N. Curare-like action is dependent upon the presence of 4 C atoms united to the same N atom, either directly or through the medium of another N atom. All hydrazine derivs., in which all 4 H atoms are displaced by organic radicles united by C to the N, will be found to possess a curare-like action.
I. GREENWALD.

The Chemical Regulation of Vascular Tone as Studied upon the Perfused Blood Vessels of the Frog. D. R. HOOKER. Phys. Lab., Johns Hopkins Univ. *Am. J. Physiol.*, **28**, 361–7.—Vascular tone, as detd. by perfusing modified Ringer soln. through the blood vessels of a pithed frog, is increased by Ca ions, and decreased by Na and K ions, CO_2 and urea. The musculatures of the vascular system and of the intestin give opposit responses under the influence of CO_2 and O.
J. F. LYMAN.

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The Relation between the Physical, Chemical and Electrical Properties of the Nerves. V. The Action of Cinchonamine Hydrochloride on Frog's Nerve. F. O'B. ELLISON. Physiol. Lab., St. Marys Hospital Med. School. *J. Physiol.*, 43, 28–33.—When applied to th whole length of the nerve the drug increases the injury current and abolishes the negative variation. When applied to the injured end only both injury current and negative variation are increased. When applied to the uninjured surface only negative variation is abolished and the injury current not increased. The phenomena observed could not be produced by an alteration in the conc. of the electrolytes due to the presence of the drug. J. F. L.

The Study of the Action of Various Salts on Isolated Muscle. I. Sodium, Potassium and Ammonium Salts. P. G. WARD. *Proc. Physiol. Soc.*, 1911; *J. Physiol.*, 43, 1.—When isolated frog sartorius is treated with solns. of Na, K and NH_4 salts the abolition of response to direct excitation takes place in the order: K, NH_4, Na. Recovery from the effects of K salts is rapid; from NH_4 and Na it is much less pronounced. J. F. L.

Mydriatic Action of Extracts and Fluids Obtained from Organs. EDOARDO CATAPANO. *La presse med.*, 1910, No. 77; *Rec. opth.*, 1911, 17; through *Zentr. Biochem. Biophys.*, 12, 70.—Suprarenals and hypophysis glands gave H_2O exts. which possessed intense mydriatic power. Thymus, kidney, pancreas, liver, ovary, muscle and testicles treated similarly showed less but a very evident mydriatic action, while the aq. and alc. exts. of brain and the aq. ext. of thyroid or of spleen showed no such power. The mydriatic substance is in the tissues, is not in the blood serum, is sol. in H_2O and in alc. and is not thermolabil. The hypothesis that the mydriatic power of the urin and blood serum in nephritis and uremia is caused by a hypersecretion of the suprarenals is held to be untenable. I. K. P.

Medicinal Applicability of Titanium Compounds. JULIUS PICK. *Mediz. Klinik*, 1911, 4033; through *Schweiz. Wochschr.*, 49, 632.—All sol. inorganic and organic Ti compds. check putrefaction of vegetable and animal proteins. Addition of 0.1 g. Ti sulfate to 20 g. of putrescent liquid deodorizes the latter. Ti salts had no poisonous effect when taken internally. P. used Ti disulfate and Ti salicylate in diseases of bacterial origin. It is especially effective in lupus. S. WALDBOTT.

Action of Crotalus Toxin. IVAR BANG AND E. OVERTON. Univ. Lund. *Biochem. Z.*, 34, 428–61.—Solns. containing more than 0.1% of dried crotalus toxin affect tadpoles. The addition of small quantities of hemolyzed blood corpuscles increases the toxicity 300 times. The same result is obtained if lecithin is used in place of the hemolyzed blood cells. When $CaCl_2$ soln. is added to the mixt. of toxin and hemolyzed blood corpuscles the toxicity is destroyed. The addition of antivenin (Inst. Pasteur, Lille) either destroys or markedly lowers the toxicity of venom and hemolyzed blood corpuscles. G. M. MEYER.

Fixation of Tetanus Toxin. II. SIEGFRIED LOEWE. Leipzig. *Biochem. Z.*, 34, 455–511.—Tetanus toxin differs in its reactions from other true toxins. The fixation of tetanus toxin by brain matter is not a chem. reaction. It can be explained as a distribution of the toxin according to the laws of Henry. G. M. M.

Mercury Therapeutics of Experimental Syphilis in the Rabbit and Brazilian Spirillosis. L. LAUNOY AND C. LEVADITTI. *Compt. rend.*, 153, 304–6.—Mercuric potassium-phenylmethylaminodithiocarbonic-acetate $\left(\begin{matrix} C_6H_4—CH—COOK \\ | \\ CH_3—N—CS—S \end{matrix}\right)_2 Hg$, was used in treating experimental syphilis in the rabbit and spirillosis in chickens and found to possess decided curative properties. G. M. M.

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Alkaloids of Fly-agaric and Muscarine (HONDA). 17.

I. ZOOLOGY.

R. A. GORTNER.

The Influences of Bases on the Development and Oxidative Processes of the Sea Urchin (Arbacia). JACQUES LOEB AND HARDOLPH WASTENEYS. Rockefeller Inst., New York. *Biochem. Z.*, **37**, 410–23.—In solns. of NaCl + KCl + $CaCl_2$ in which the OH^- conc. was regulated by addition of HCl or NaOH, increase of OH^- conc. from 10^{-10} to 10^{-4} increases the rate of O consumption by only about 20%. From 10^{-4} to 8.10^{-4} the O consumption rose 100%. At the same time the segmentation of the eggs was inhibited by the increase in OH^- conc. The inhibition did *not* result from the increased rate of oxidation, however. The same increase in oxidation may be caused by raising the temp. from 20° (the temp. of the expts.) to 30°, with an acceleration of the rate of development of the eggs. Futhermore, addition of a small amt. of NaOH to NaCl + KCl soln. increases the toxicity, while the same addition to NaCl + $CaCl_2$ decreases the toxicity, although in both cases the influence of the NaOH on the O consumption is the same. It is also probable that the effect of the NaOH is not due to the presence of OH^- ions, because the same effect is caused by similar concs. of NH_4OH, and in the development of *Strongylocentrotus* the NaOH can be replaced by even so weak a base as neutral red. The effect of the bases is probably due to salt formation. The O consumption in neutral soln. is about the same in NaCl + KCl as in NaCl + $CaCl_2$. A depressing effect on the part of Ca, such as was noted by Meyerhof, could not be detected. D. D. VAN SLYKE.

Color of Light Emitted by Lampyridae (COBLENTZ), (SINGH, MAULIK). 2.

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12. FOODS.

W. D. BIGELOW.

The Study of Stringy Bread. E. KEYSER AND H. DELAVEL. *Compt. rend.*, **153**, 576–8.—Stringy bread is brought about by the action of bacilli related to the group, mesentericus, whose spores are resistant to physical and chem. agents. These bacilli develop rapidly, produce spores and form a yellowish brown coloration, becoming viscous in spots and giving off a disagreeable odor similar to that of a mixt. of valerianic acid and essence of turpentine. The bacillus does not develop in gluten bread, except on addition of maltose; it is capable of inverting cane sugar and lactose, but prefers maltose, asparagine and peptone as food. In ordinary bread the products of decomp. are EtOH, Et_2O, valerianic acid, acetylmethylcarbinol and protein degradation products. The final reaction is sometimes acid and sometimes alkaline. Tests showed that the addition of 1.9–2.0 g. AcOH per kg. of dough, together with 30 min. baking suffice to prevent germination of spores in bread of 250–500 g.; for breads of 1000 g. a 45 min. baking is required. The breads may be kept at 25°. The bacillus has its origin in the flour. When a bakery becomes infected, all utensils should be washed with boiling acidulated H_2O, and the bread should be stored at low temp. Sponge bread is less subject to these changes than bread made with yeast.
J. A. LECLERC.

Latest Work on the Estimation, Preservative Power and Permissibility of Benzoic Acid (1908-1911). K. B. LEHMANN. *Chem. Ztg.*, **35**, 1297–9, 1314–7.—A critical review of the literature on BzOH for the last three years. P. B. DUNBAR.

The Milk Preservative, "Soldona." OSKAR V. SOBBE. *Chem. Ztg.*, **35**, 1344.—This is a soln. of HCOH, H_2O_2 and H_2O. P. B. DUNBAR.

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Kobert's Reagent as a Test for Salicylic Acid. J. McCRAE. *Analyst*, **36**, 540.—Kobert's reagent (3 drops HCOH soln. in 3 cc. H_2SO_4) gives a characteristic rose color with salicylic acid, salicylates and acetylsalicylic acid. The reaction is most delicate when about 0.02 mg. is dissolved in 2 drops H_2SO_4 and a drop of the reagent then added. The color develops in a few min. With salol the color appears more quickly. H_2SO_4 gives a red color with salicin but Kobert's reagent produces a deeper and richer color. The reagent gives the following characteristic colors with other substances: Phenol, red-violet; catechol, violet (redder than the color produced with morphine); resorcinol, deep orange-brown; hydroquinone, dirty greenish brown; pyrogallol, brown; α-naphthol, dirty green; β-naphthol, dirty brown; cinnamic acid, brown; mandelic acid, yellow. P. B. D.

The Determination of Gliadin or Alcohol-soluble Protein in Wheat Flour. R. HOAGLAND. *J. Ind. Eng. Chem.*, **3**, 838–42.—Shaking the sample continuously for 60–90 min. gives equally as high results as when the ordinary method, covering 18–24 hours, is followed. While b. alc. extracts slightly more protein than cold alc., there does not appear to be any advantage in its use. Alc. of 45–55% by wt. exts. more protein than alc. of any other strength; hence alc. of 50% by wt. should be adopted for this detn. A. W. BROOMELL.

Fraud in Grain from Tunis. ANON. *Ann. fals.*, **37**, 584.—Numerous shipments of grain have recently been received at Marseilles containing 2–26% of earth and sand. P. B. DUNBAR.

Cooking and Chemical Composition of some English Fish. K. I. WILLIAMS. *Chem. News*, **104**, 271–4.—The comp. of foods prepared for eating is discussed and the % of waste in the prep. of certain fish recorded. The fish after b. showed a loss in wt. of from 6.0% to 35.0%. The price per lb., date, portion analyzed, wt. before and after cooking, and the % of flesh and waste in the cooked fish are tabulated. The waste, *i. e.*, bones, heads and skins, yielded from 0.2–9.23% gelatin. In the prep. of the fish for analysis the flesh was broken into small pieces and the surface H_2O removed. Drying was carried out on a steam bath and in an air oven not exceeding 110°. The ground samples were analyzed for ash, fat, N and reducing substances. Proximate analyses of the flesh of 25 varieties of cooked fish are tabulated. The SO_3 0.22–0.85%, the P_2O_5 0.25–1.33%, and fat 0.26–24.59%. Compared with meat, the % of refuse is greater in market fish, the % of H_2O higher in both cooked and uncooked condition. As a source of protein they are about equal. F. C. COOK.

Relation between Water Content of Butter and the Refraction of Butter Fat. A. MULDER. Assen. *Chem. Weekblad*, **8**, 744–52.—M. points out a parallelism between high indices of refraction in the butter fats and frequency of cases of high water content. Among the salted butters examined, grouped by months, the percentages of cases of a water content of 15.5% and over increases regularly with the increase in the indices of refraction. With the unsalted butters this parallelism is less regular through the several months, but it holds for the year as a whole. P. A. YODER.

The Purine Content of Foods. KARL M. VOGEL. *Münch. med. Wochschr.*, **46**, 2433–4.—V. gives in table form the results of his own detns. of purine-base N content of the ordinary foods (beef, muscle, liver, thymus, spleen, codfish, wheat, rye, pea and maranta flour, white and rye bread, hominy, oats, rice, potatoes, spinach, tomatoes, milk, swiss cheese and eggs) and also the figures of Walker Hall, Bessau and Schmid, and Hesse. H. J. CORPER.

Wheat and Flour Investigations. R. W. THATCHER, G. A. OLSON AND W. L. HADLOCK. Wash. Agr. Col. Exp. Sta., *Bull.* **100**.—Analyses and tests of 1908 and

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1909 crops, a discussion of the comp. and milling quality of Washington wheats, and a description of a simple app. for detg. the milling qualities of wheats.
WM. P. GARRETY.

Milling Tests of Wheat and Baking Tests of Flour. J. T. WILLARD AND C. O. SWANSON. Kan. Agr. Col. Exp. Sta., *Bull.* 177.—Copious data are given, and an attempt is made to trace a connection between milling and baking qualities of flour. Results of various modifications of the processes are given, also analyses of about 60 wheats.
WM. P. GARRETY.

California White Wheats. G. W. SHAW AND A. J. GAUMNITZ. Cal. Col. Agr. Exp. Sta., *Bull.* 212.—Comp. and other data relating to California wheat and flour.
WM. P. GARRETY.

Bread—its Value in the Ration. G. H. ESTES. *Infantry J.*, 7, 716–26.—Comp. and other data relating to bread in the army.
WM. P. GARRETY.

The Relation between the Refraction and Specific Gravity of Milk Serums. EDWIN ACKERMANN. *Z. Nahr. Genussm.*, 22, 405–8.—Calculating from the figures of Fendler, *et al.* (*C. A.*, 4, 3100), it is evident that there is no close relation between the d. of the AcOH serums and the n of the $CaCl_2$ serums of milk, but when both figures are detd. on the $CaCl_2$ serum the variation between the highest and lowest d. for each value of n is less than 0.0003. Using the formula of Wiegner, $n = 970.88\, d_{16}^{16} - 957.06$ or $d_{16}^{16} = 0.00103\, n + 0.98578$, for calculating d. from n. of 120 samples of milk containing up to 50% added H_2O, 48 showed no diff. between the calc. and the detd. value, 55 showed 0.0001 diff., and 17 0.0002 diff., which indicates that n may be accurately calc. from a detn. of d., thus obviating the necessity of filtering, as small particles of casein do not interfere with the detn. of d. Details of the method and a table to facilitate calc. are included.
H. S. BAILEY.

The Behavior of Steril and Boiled Milk towards Rennin and Acid. ALOIS KREIDL AND EMIL LENK. Physiol. Inst., Univ. Vienna. *Biochem. Z.*, 36, 357–62.—Sterilized milk in steril vessels is not coagulable by rennin which has been sterilized by heating to 105° for an hr. Touching the milk with the unsterilized finger or addition of a drop of ordinary milk starts coagulation. The lactic acid bacilli develop best in slightly acidified milk (0.2–0.6 cc. 0.1 *N* AcOH per 10 cc.). Addition of acid to steril milk in amts. up to $^1/_5$ vol. cause neither pptn. nor subsequent increase in acidity when the milk is kept at incubator temp.
D. D. VAN SLYKE.

A Simplification of the Method for Determining Nitrates in Milk with Diphenylamine-Sulfuric Acid Reagent. J. TILLMANS AND A. SPLITTGERBER. *Z. Nahr. Genussm.*, 22, 401 (1911); cf. *C. A.*, 5, 727.—The method of preparing the serum is modified as follows: 25 cc. milk are shaken in a 50 cc. cylinder with 25 cc. of a mixt. of equal. vols. of 5% $HgCl_2$ soln. and 2% HCl soln. The serum is filtered off. 1 cc. of the filtrate is treated with 4 cc. Tillmans' diphenylamine reagent and allowed to stand 1 hr. A blue color indicates presence of N_2O_5. For quant. estns. known aq. solns. are made up for comparison. By taking resp. 0.45, 0.85, 1.2, 1.5 and 2.0 cc. of KNO_3 soln. containing 0.1871 g. per l., and 2 cc. satd. NaCl soln. and making up to 100 cc. with distilled water, solns. are obtained containing 1, 2, 3, 4 and 5 mg. N_2O_5 per l.
B. B. SCHNEIDER.

Comparison of the Methods of Bonnema, of Dekker and of Soxhlet for the Estimation of Fat in Milk. L. RIJNEVELD. *Pharm. Weekblad*, 48, 1204–5; cf. Bonnema, *Pharm. Weekbl.*, 43, 1347.—Quant. comparisons show that all 3 methods give equally good results.
V. E. HENDERSON.

Estimation of the Specific Gravity of Minute Quantities of Milk. ALOIS KREIDL AND EMIL LENK. Vienna. *Biochem. Z.*, 35, 166–8.—The authors take advantage of the

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fact that the fat in milk cannot be extracted by shaking with the ordinary solvents such as Et_2O, $CHCl_3$, CCl_4, C_6H_6, etc., and prepare mixts. of these in such a way that when drops of the milk are added they will neither sink nor float. The sp. gr. of such a liquid will equal that of the milk. F. J. B.

The Quantitative Estimation of Milk Fat by means of the Fat Globules. H. P. T. Oerum. *Biochem. Z.*, **35**, 18–28.—The mathematical relationships between the no. of fat globules in a given vol., the transparency of the milk and the amt. of fat present are discussed. By means of a given formula for each variety of milk it is possible to approx. est. the amt. of fat present. Since, however, each observer must work out his own formula the method remains at present of theoretical interest only.

F. J. Birchard.

Analysis of Altered Milk. Leon Ronnet. Rheims Municipal Lab. *Ann. fals.*, **4**, 557–61.—The methods proposed by Thorpe (*C. A.*, **4**, 1191) and Kling and Leroy (*C. A.*, **3**, 2183, 2720) for the analysis of old milk samples are tedious. The following is a better procedure: Mix the entire sample with $^1/_4$ its wt. of sand in an evapg. dish and dry on a water bath, stirring occasionally with a spatula. Transfer to an oven (90–95°) and dry to const. wt.; then remove carefully from the dish and grind fine in a mortar. The fat, N, etc., may then be detd. on the dry substance.

H. S. Bailey.

The Iron of the Food of Infants. L. Langstein. *Jahrb. Kinderheilk.*, **74**, 536–40.—The Fe content of the milk of cows of different breeds and subsisting upon different foods was 0.3 to 0.7 mg. per l. The higher values reported in the literature are attributed to the insufficient amt. of milk taken for analysis and to extraneous contamination. In the expts. of the author the milk was collected directly in glass vessels. The ordinary market milk contained as much as 3 mg. Fe per l. M. S. Fine.

Chemical Composition of Human Milk as Shown by New Analyses. Ernst Schloss. Waisenhaus Rummelsburg. *Monatsschr. Kinderheilk.*, **9**, 636; through *Zentr. Biochem. Biophys.*, **12**, 17.—The original gives analyses of a whole day's milk and of a part of a day's milk from 8 wet nurses. No uniform relationship between any components except fat was found. N showed a general parallelism with total ash. The milk sugar content was in inverse proportion to the ash. I. K. Phelps.

Nutritive Value of Buffalo and Cow Milk (Investigations with the Pioscope and Cytogalactometer). II. G. Magini. *Atti accad. Lincei*, **20**, II, 439–43; cf. *C. A.*, **6**, 261.—Of 10 samples of cow milk, exam. with the pioscope, 4 corresponded to the sector "cream," 6 to normal;" of buffalo milk, 3 corresponded to "cream" and 7 showed a central disk whiter than for "cream." Under the cytogalactometer, buffalo milk was found to contain about $^1/_3$ more globules than cow milk and those of medium and max. size (μ15 and more) predominated, while in cow milk the small (μ2–3) and medium-sized (μ5–9) globules preponderated. Although these cannot compete with chem. methods in accuracy, they afford easy and rapid means for the estn. of the nutritive value of milks. Chas. A. Rouiller.

Milk and Cream Chocolates. Tenth General Meeting of the Association of German Food Chemists. E. Baier. *Z. Nahr. Genussm.*, **22**, 121–9; cf. *C. A.*, **5**, 542.—The following definitions were proposed: (1) Cream, milk, or skim-milk chocolates are chocolates containing these ingredients in either natural, condensed or dried form and must correspond by name to the ingredients used. (2) The fat content of whole milk shall be at least 3%, cream 10%. If condensed or dried milk or cream is used, the comp. must correspond to the above. At present cream chocolate shall contain at least 5.5% milk fat in the form of cream or cream in addition to milk. (3) Milk or skim-milk chocolate shall contain at least 10% milk or skim-milk solids, cream

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chocolate at least 10% cream solids. (4) Milk or cream can only be used in place of sugar. It must not be used in place of the chocolate material. Definition 3 was modified by vote for milk or skim-milk chocolate to contain at least 12.5% milk or skim-milk solids. Cream, 10% as proposed. M. C. ALBRECH.

Soy Bean Milk. O. LOEW. *Chem. Ztg.*, **35**, 1222.—A brief description of the method of manuf. Analysis: Protein 4.87%, N-free material 4.53%, H_2O 89.29%, ash 0.48%. H. S. BAILEY.

Condensed Milk. I. F. G. H. COUTTS. *Brit. Food J.*, **13**, 181.—Report on condensed milks with special reference to their use as infants' food, the history of condensed milk, its varieties, methods of prep. and comp. P. B. DUNBAR.

Analysis of Fruit Juices. CROCHETELLE AND MILON. *Rev. chim. ind.*, **22**, 325.—A preliminary study of sugar methods for use in the analysis of fruit juices. P. B. D.

Chemistry and Ripening of the Date. A. E. VINSON. Univ. Ariz. Agr. Exp. Sta., *Bull.* **66**, 403–35; cf. *C. A.*, **4**, 362, 3240.—Two types of dates exist —invert sugar and cane sugar types, detd. by the presence or relative absence of invertase. Most or all the sugar in the invert type passes through the form of cane sugar, which it contains in large proportion at some stage of development. A great increase in sugar content appears just before ripening, making artificial ripening before this time inadvizable. In the unripe date, the invertase is probably in insol. combination with the protoplasm. When ripening begins, the invertase changes from the endo or intracellular form to the ecto or extracellular form, which is readily sol. in water or glycerol. Sol. tannin in green dates does not prevent soln. of invertase in glycerol, nor does invertase pptd. by tannin or Pb subacetate lose its power of inverting cane sugar. Most of the tannin is deposited as insol. grains in the tannin cells near the cuticle, which may be accomplished any time by the action of nitrous ether vapor. In some varieties, premature ripening may be induced by chem. action, or by destroying the protoplasm by heat. WM. P. GARRETY.

Ripening Dates by Incubation. G. F. FREEMAN. Univ. Ariz. Agr. Exp. Sta., *Bull.* **66**, 437–56.—Natural conditions in Arizona are not favorable to ripening of dates. Artificial ripening with regulation of conditions of temp. and moisture produces good results. The tissues are softened, tannin pptd. in insol. form, and the sugar nearly all inverted. WM. P. GARRETY.

The Connection between Tannin and another Colloid in Rape Fruit, Especially Phoenix, Persimmon and Sapodilla Plum. F. E. LLOYD. Alabama Polytech. Inst. *Z. Chem. Ind. Kolloide*, **9**, 65–73.—Tannin and another colloid exist together in the tannin vacuole of all fruits examd. In the unripe fruit this second colloid is in a slimy condition, and during ripening it becomes gelatinous and combines with the tannin to form a solid soln. The structure of the tannin mass depends on the characteristics of this 2nd colloid. This slime is not the same as that which covers the outer surface of plants; it is a carbohydrate and can be hydrolyzed into sugar, but has not been obtained free from tannin. H. ISHAM.

Non-acid Ciders. G. FILAUDEAU. *Ann. fals.*, **37**, 582.—Analyses are reported of four ciders which were kept unchanged and palatable for more than a year, although often exposed to summer heat. The samples contained no preservatives, but excessive fermentation was prevented by frequent racking during the spring and summer. P. B. DUNBAR.

The Detection of Nitric Acid in Watered Fruit Juices. ROBERT COHN. *Z. öffent. Chem.*, **17**, 361.—C. has recently found some undoubtedly pure raspberry juices

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which fall below 0.5% ash, which is the minimum limit for an unwatered juice. The test for nitrates may often be used to prove the addition of water to juices which are low in ash and alkalinity of ash. The method is as follows: 75 cc. of fruit juice are made slightly alkaline with NaOH and evapd. almost to dryness on a water bath. The thick sirup is treated with 50 cc. alc. and stirred several min. at about 40°. The alc. takes up the nitrates, leaving most of the organic matter undissolved. The alc. soln. is evapd. and the residue dissolved in 10 cc. water. If the residue from the alc. is dark colored, it is again extracted with alc. and evapd. before dissolving in H_2O. This soln. is then tested for nitrates by the diphenylamine-H_2SO_4 reaction. It is advantageous to cool the test tube containing the reagent with water, and also to cover the layer of reagent with a layer of distilled water to which is added the soln. under exam. Pure raspberry, currant and cherry juice give no reaction. Huckleberries contain glucoside-like compds. which give a blue color with H_2SO_4. Pure raspberry, currant, cherry and huckleberry juices give no ppt. with AcOH solns. of nitron, but in the presence of nitrates a white cryst. ppt. forms. P. B. DUNBAR.

Servian Plum Jam. (Pflaumenmus.) W. BRUNETTI. Servian State Lab., Belgrad. *Z. Nahr. Genussm.*, 22, 408–11.—A short description of the fruit, prep. of the jam and methods of analysis are given. A table of results shows complete analyses of 3 samples. E. M. CHACE.

The Detection of Saponin and Glycyrrhizin in Effervescent Drinks by the Methods of Vamvakas and Frehse. A. BEHRE. Chemnitz. *Z. Nahr. Genussm.*, 22, 498.—Experimental proof is given that both methods are worthless. The disturbing factor in the Vamvakas procedure in sugar, a small amt. of which remains with the saponin and glycyrrhizin throughout the process of purification and finally causes a reduction of the Nessler soln., upon which a positive reaction depends, and which would lead to false conclusions when saponin and glycyrrhizin are absent. The failure of Frehse's test is ascribed to the insolubility of saponin and glycyrrhizin in EtOAc.
A. F. SEEKER.

Changes in the Acid Content of Vinegar "Spirit" during Storage in Wood. A. BEHRE. Chemnitz. *Z. Nahr. Genussm.*, 22, 506.—A sample of vinegar "spirit" stored in a wooden barrel and examined at intervals during 10 months gradually increased in acid content from 7.10 to 9.12 g. per 100 cc., the water having evapd. more rapidly than the AcOH. Expts. with AcOH products of various acid content showed that in uncovered glass vessels with small openings the acid strength remains practically unchanged except in products containing 60 or more g. per 100 cc., in which a gradual loss of acid content occurs. When kept in open beakers strong AcOH solns. (60 or more g. per 100 cc.) lose acid much more rapidly than water, 19 g. solns. remain of constant strength, while weaker solns. (15, 7 and 3 g. per 100 cc.) become stronger. The total loss of soln. in open beakers varied inversely as the AcOH content, a 61.2 g. soln. losing 31.7% and a 3.17 g. 75% by evapn. A. F. SEEKER.

A Proposed Test for Factitious Invert Sugar in Honey. E. FEDER. Aachen. *Z. Nahr. Genussm.*, 22, 412.—Mix 5 g. of honey (not more) with 2.5 cc. of freshly prepared $C_6H_5NH_2$.HCl soln. (100 cc. $C_6H_5NH_2$ and 30 cc. 25% HCl) in a porcelain dish, stirring into a homogeneous mass. In the presence of considerable factitious invert sugar a bright cherry-red color appears at once, which begins to fade in 15 min. and in 30 min. becomes orange. The initial color with honey containing small amts. of invert sugar is orange. Negative tests produce a dull yellow-brown. The test is proposed as a rapid means of distinguishing between obviously pure samples and those upon which a more complete exam. is required. A. F. SEEKER.

Honey from the Champagne Region. LEON RONNET. *Ann. fals.*, 4, 427–9.

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—Nineteen samples of sainfoin honey extracted in the cold by centrifuge showed the following variations in comp.: Polarization of 10% soln. before inversion —1.22 to —2.20°, after inversion —1.40 to —2.32°; cane sugar 0.19–5.83%; total sugars 76.95–82.41%; H_2O 15.75–19.80; ash 0.02–0.28; acidity (as acetic) 0.064–0.138; protein 0.18–0.35; Lundt's test (cc. pptd. with tannin) 1–1.6 cc. Every sample gave a negative test with resorcinol-HCl and with aniline acetate (indicating no furfural derivatives). J. A. LeClerc.

What is White Pepper? E. J. Parry. *Chem. Druggist*, 79, 167–8.—The % of crude fiber in white pepper was found to vary a great deal; in the entire fruit from 3 to 6%, in the ground pepper 3.9 to 11%. The standard accepted should be: Black pepper, ash not over 7%, fiber 10–18%. White pepper, ash not above 3%, fiber 3.5–9.5%, provided the microscopic appearance is normal. A. Vorisek.

Report of an Investigation of the Methods of Fiscal Control of State Institutions. H. C. Wright. *State Charities Aid Assoc. Pub. (N. Y.)* 122.—Annual food supply and its energy content per man per day are given for various public institutions in New York, Indiana, and Iowa. Wm. P. Garrety.

Standards for Spices. J. C. Umney. *Perf. Ess. Oil Record*, 2, 195.—Valuation of spices according to type samples as proposed by the Am. Spice Trade Assn. is regarded inaccurate. More accurate and desirable standard is found in the ether ext. A. Vorisek.

The Use of Horse Intestins as Sausage Cases. M. Muller. *Z. Fleisch Milchhyg.*, 21, 3–10.—Sausage which does not contain horseflesh, but is covered with horse intestins, may give misleading results upon analysis. Wm. P. Garrety.

Compilation of Analyses of East Indian Food Materials. J. E. Q. Bosz. *Bull. Kolon. Mus. Haarlem*, 1911, No. 46.—An extensive compilation of data includes analyses of tropical fruits and other foods. There is a graphic summary in the form of a colored chart. Wm. P. Garrety.

Food Control. D. A. de Jong, *et al. Trans. IX Internat. Vet. Cong. The Hague*, 4.—A consideration of food control, tropical tests, questions of animal production and veterinary medicin, with reference to hygiene. W. P. G.

The Comparative Value of Fresh and of Dried Grass as a Fodder. A. Morgen, C. Beger and F. Westhausser. *Landw. Vers. Stat.*, 75, 321–48.—The differences established by the feeding of fresh and of dried grass are only trifling. The dried grass showed slightly lower results, in most cases, in milk production and in digestibility than the fresh grass. E. C. Lathrop.

Reducing Enzymes (Bach). 11D. Reichert-Meissl Number (Siegfeld). 27. Dextro-polarizing Substances of the Beets (Dochlenko). 28. Fat from the seeds of *Lophira alata*, Banks (Pickles, Haywood). 27. Processing of Persimmons (Gore) 11D.

U. S., 1,004,033, Sept. 26. B. F. Johnson. **Protecting and sealing corn with the husk on.**

U. S., 1,010,043, Nov. 28. J. K. Gowen. **Making vanilla extract.**

U. S., 1,010,103, Nov. 28. H. Wilke. **Baking bread.**

U. S., 1,010,202, Nov. 28. L. M. Thomas. **Conditioning wheat flour.**

U. S., 1,010,252, Nov. 28. A. Gorskii. **Condiment.**

U. S., 1,010,721, Dec. 5. G. Brown. **Coffee-percolating cartridge.**

U. S., 1,011,182, Dec. 12. F. J. Gardner. **Preserving meat.**

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U. S., 1,011,352, Dec. 12. T. LESCARDE. **Preserving eggs.**

U. S., 1,011,730, Dec. 12. F. BRAUNBECK. **Producing a dry flour from grains and legumes.**

U. S., 1,012,147, Dec. 19. P. NOLF. **Converting the nitrogenous substances of yeast into comestibles.**

U. S., 1,012,415, Dec. 19. G. P. P. NICOLAOU. **Food compound.**

U. S., 1,012,578, Dec. 26. H. I. ANDREWS. **Desiccating milk.**

U. S., 1,012,979, Dec. 26. J. BREUSTER. **Preparing wheat for food.**

14. WATER, SEWAGE AND SANITATION.

EDWARD BARTOW.

Measurement of the Magnitude of the Hydrogen Ion Concentration of Sea Water. SVEN PALITZSCH. Carlsberg Lab., Copenhagen. *Biochem. Z.*, 37, 116–30.—Specimens of water from the Atlantic, the Mediterranean, Black Sea, and Baltic were tested. The color reaction with phenolph. and α-naphtholphthalein was used to det. the H^+ conc., known solns. of borate and HCl being used for comparison. The H^+ conc. was found to be quite const., varying only $10^{-7.95}$–$10^{-8.35}$. D. D. VAN SLYKE.

Purification of Non-potable Waters and Methods of Analysis. MIGUEL CORDERO. *Anales inst. med. nacional*, 10, 212–57.—Discussion. H. S. PAINE.

Water Disinfection by Hypochlorite Treatment in the Province of Quebec. J. O. MEADOWS. *Eng. News*, 66, 557.—Shows favorable results obtained by the use of hypochlorite, in the treatment of various municipal supplies in Quebec. Especial attention is paid to the results at Montreal. D. K. FRENCH.

Water Softening as a means of Reducing the Expense of Locomotive Repairs. WILLARD A. SMITH. *Railway and Engineering Review*, Feb. 11th–May 27th, 1911.—The following table shows results obtained by water purification on the Central Kansas and Colorado divisions of the Missouri Pacific Railway:

Year.	Mil. net ton miles.	Engin failures due to leaky flues and foaming.	Cost of engin failures due to leaky flues and foaming.	Boiler maker's salary in dollars.	Total no. of gallons of water used.	Total no. of gallons treated.
1905	470.6	625	$10,880	$81,500	564,800,000	16,400,000
1906	490.3	552	9,630	65,760	588,400,000	166,900,000
1907	652.0	311	5,420	60,030	665,400,000	175,587,000
1908	578.4	161	2,820	40,250	606,300,000	251,800,000
1909	637.3	345	6,003	54,330	752,500,000	318,734,000

(Note: Av. hardness of water on these divisions for above period was 21.02 grains per U. S. gallon. Av. % of incrustants removed by treatment was about 70. Cost of engin failures due to leaky flues and foaming, estd. on the basis of $1.00 per train mile lost, amounted for the years 1907, 1908 and 1909 to $17.40 per engin failure.) The unusual no. of engin failures for 1909 is due to a boilermakers' strike. Nevertheless there is an increase of 35% in the net ton mileage with a reduction of 45% in the no. of engin failures and $^2/_3$ of the expense for boiler repairs. Only about 40% of the total water is treated, removing about 70% of the incrustants at a cost for attendance, chemicals, interest and depreciation of one cent per 1,000 gals. The total cost of treating water on these divisions from 1905 to 1910, is $9,130, against which may be balanced a total saving of $105,630 on boiler repairs. A great saving in fuel bill results when all the water is treated. L. C. JONES.

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The Decomposition Powers of Bacteria in Water Tests on a New Method of Water Examination. Wm. Spät. Hyg. Inst. deut., Univ. in Prag. *Arch. Hyg.*, 74, 237–88.—The NH_3 formed (liberated by magnesia) in a 2% Witte's peptone soln., was used as a test for the baterial content of a large number of waters. NH_3 was never formed by steril waters, bacteria-poor waters formed a small amt., while bacteria-rich and impure waters formed a large amt. The decomp. does not always go hand in hand with the abs. bacterial count as water bacteria only form small amts. of NH_3. Soil bacteria, however, form large amts. An NH_3 content of over 5 cc. 0.01 *N* NaOH speaks for upper soil contamination and this is valuable in detg. the quality of the water. In poor waters this amt. was formed in 24 hrs. Standing at room temp. did not change the decomp. properties for a long time. Drainage water showed a strong NH_3 formation with odorous decomp. of the media. H. J. Corper.

Tests of Water Sterilizing and Purifying Methods at Marseilles, France. Anon. *Eng. News*, 66, 525.—Eight different installations were tested, each designed to treat 52,840 gals. of water in 24 hrs. 1, 2 and 3 were diff. applications of the Puech-Chabal roughing filters; 4, ultraviolet ray app. preceded by Puech-Chabal filters; 5 and 6, ozone treatment (two systems); 7, alum and chloride of lime; 8, alum alone. The original bacterial count of the water was very high. Results with ozone treatments were most satisfactory, the purified water showing 2-5 and 3–9 germs, and no trace of *B. coli;* the ultraviolet ray method gave 1–3 germs in the purified water, but the engineers in charge felt that the same results were not assured for a large installation. D. K. French.

The Question of Pipes at the International Hygiene Exposition at Dresden. Anon. *Stahl u. Eisen*, 31, 1485–93.—Many varieties of corroded pipes are discussed and illustrated. E. J. Witzemann.

Reading (Pa.) Water Works Notes. Anon. *Mun. J. Engr.*, 31, 789–90.—The Engelman filters consist of two open beds, in operation since 1903. During the past year the sand down to the gravel was taken out of the filters to remove the cause of sub-surface clogging. The total cost of filtering the water, per mil. gals., was $8.80. The bacterial reduction of the effluent of the filter amounted to 99.3%; the % removal of bacteria in the effluent of the Antietam filters was 98.9. Arthur Lederer.

The Municipal Water Softening and Purification Plant at Georgetown, Ky. J. K. Hopkins. *Eng. Record*, 64, 706–8.—The supply is obtained from a large spring near the center of the town. Much surface drainage and sewage leaked into it from defective sewers. Lime and soda ash are the chems. employed. Occasionally $FeSO_4$ is introduced in addition when the water is muddy. Further purification is provided for by the introduction of hypochlorite. The resulting sludge is led to the sanitary sewer. The operating results are very satisfactory. Arthur Lederer.

Report on Jamaica Drainage District. W. M. Black and E. B. Phelps. *Mass. Inst. Tech.*, 7, 125–48.—The ability of the bay water to dispose of the sewage entering into it is discussed. The O satn. value of the water can be reduced to 75% with safety. A reduction below 50% will cause a nuisance. At several of the outlet sewers purification is recommended. The character of disposal varies according to the sewage and the portion of the bay into which it is to empty. S. T. Powell.

Report on Oxygen Content of Sea Water as a Standard for Measuring Sewage Pollution. W. M. Black and E. B. Phelps. *Mass. Inst. Tech.*, 7, 185–93.—Thirty % of the dissolved O can be removed from water by sewage with safety but a loss greater than 50% will cause the water to become offensive. The source of reaeration of N. Y. harbor water are given. N. Y. harbor water should be pure enough to maintain major fish life everywhere. This requires that the dissolved O value shall be about 70% of satn. S. T. Powell.

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The Sewage of Ammonia Works. ANON. *Z. gesammte Wasserwirtsch*, 1911, 27; *Wasser u. Abwasser*, 4, 537.—The sewage contains principally $Ca(OH)_2$, $CaSO_4$, $CaCl_2$, $Ca(CNS)_2$. In addition it may contain CaS, $CaCO_3$, and small quantities of tar, phenol and pyridine compds. The sewage of the plant investigated was allowed to permeate through 20 m. of the soil before being allowed to reach the waters of a small brook. The filtered affluent gave no H_2S reaction. After a short distance the brook water became milky in appearance, due to pptd. S and $CaCO_3$. ARTHUR LEDERER.

Report upon a Visit to Various Sewage and Chemical Works. H. M. WILSON. West Riding Rivers Board, Wakefield, Eng. *Wasser u. Abwasser*, 4, 493 (1910.)—At Penrith the sewage is removed from the settling tanks and drained over a layer of litter. The plant at Carlisle consists of a sewage-lifting app., a screen, grit chamber, settling tanks and percolating filters. The "Cambuslung Gas Works" purify their NH_3 production waste by the method patented by Radcliffe. The purified effluent is not satisfactory, however. The NH_3 production (method of Otto-Hilgenstock) as observed at Glascow is remarkable in that but little liquid waste escapes.
ARTHUR LEDERER.

The Leading Organisms of a Sewage Canal. R. RICHTER. *Pharm. Zentr.*, 52, 613–20.—In the Gross-Schweidnitz canal, the sewage of which is treated chemically, the purified effluent was found inhabited by the following predominating forms: Protozoa: *Charchesium lachmanni*, Ehbg., Algae: *Synedra ulna*, Ehbg., *Ulothrix subtilis*, Ktzg., *Stigeoclorium tenue*, Ztzg., *Rhizoclonium hiero glyphycum*, Ktzg., *Oscillatoria antharia*, Jürgens, *Vaucheria sessilis*, DC. and a number of others. Some of these disappear during winter; all cease to live when the water becomes mixed with the water of a brook into which the canal empties. A. VORISEK.

Works for the Purification of Liquid Trade Refuse at Livingstone Mill, Batley (Eng.). H. MACLEAN WILSON. *Wasser u. Abwasser*, 4, 529–31.—This mill produces tweed and worsted coatings and suitings. The liquid refuse is from the process of piece scouring and dyeing. The scouring liquid is conveyed for the recovery of grease to tanks at an adjoining mill, leaving only the washing-off water and dye water to be treated. The vol. of refuse liquids is 7,500 gal. per day. The crude liquids are first discharged to an underground receiving tank, and from this they are lifted by a pump to the purification works. Milk of lime is first added to neutralize and ppt. the refuse, then the liquids pass through a detritus tank, and from there into a large settling tank (9,400 gal. capacity), then into a smaller tank (3,400 gal. cap.), and finally through a straining filter of fine wood shavings. A sludge filter 18 in. deep, consisting of graded clinker, is provided for. When the weather is favorable the sludge dries in 3–4 days and is then carted away. Results are good. ARTHUR LEDERER.

The Sanitary Importance of Sulfite Cellulose and Chlorinated Lime Bleach Waste. I. SCHLAUF. *Der Antsarzt*, 3, 1; *Wasser u. Abwasser*, 4, 537–9.—The acid sulfite wastes and the residual sludge from the bleach works are among the most poisonous of trade wastes and difficult to purify. Poisonous character of the waste depends upon the quantity of free H_2SO_3. Expt. proved that quantities as low as 0.005 mg. of free acid per l. was detrimental to fish life. To avoid neutralization and purification these wastes must, therefore, be enormously diluted. A. L.

U. S., Reissue 13,338, Dec. 12. A. BRANDES. Original Pat. No. 904,114, dated Nov. 17, 1908. **Softening water.**

U. S., 1,011,656, Dec. 12. R. E. STEVENSON. **Water-softening apparatus.**

U. S., 1,012,808, Dec. 26. W. B. BULL. **Purifying water.**

U. S., 1,012,809, Dec. 26. *Idem.* **Apparatus for purifying water.**

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15. SOILS AND FERTILIZERS.

F. P. VEITCH.

General Method for the Analysis of Arable Soils. FEDERICO VILLASENOR. *Anales inst. med. nacional*, 10, 277–390.—Discussion. H. S. PAINE.

The Influence of Lime and Humus upon the Mechanical, Physical and Chemical Constitution of Clay, Loam and Sandy Soil. II. Influence upon the Absorption of Bases and the Solubility of Soil Constituents. W. THAER. Univ. Göttingen. *J. Landw.*, 59, 107–35.—Extracts from limed and unlimed soils of various types showed that the latter yielded more humus to the ext. The zeolites play a much more important role than the humic acids in the exchange of bases when lime or potash in sol. form is applied and consequently participate more prominently in the absorption of applied potash and in yielding up potash when lime is applied. P. A. YODER.

Basic Slag Phosphates. V. A. KROLL. *Chem. Trade J.*, 49, 367, 395, 421.—A complete history of the controversy regarding the chem. nature of basic slag phosphates. K. ascribes to carnotite the formula $(3CaOP_2O_5; 2CaOSiO_2)_3$; to hilgenstockite, which can never appear in any large quantity, $(3CaOP_2O_5; CaO)_3$; to steadite, which is intermediate between tribasic and tetrabasic phosphate, the formula $3((CaO)_2 P_2O_5)$; $2(CaO)$, $1(CaO_2)$, SiO_2. The new constitutent, thomasite, found by K. is always found in homogeneous crypto-cryst. masses, is hard to identify, is hexabasic, and to it is ascribed the formula $6CaO, P_2O_5; 2FeO, SiO_2$. It is derived from octobasic phosphate and a new silicophosphate, $(3CaO, P_2O_5; 4(2CaO, SiO_2))$, and bears the same relation to these 2 that steadite bears to carnotite and the tetraphosphate. Tetraphosphate, steadite and carnotite form one group and octo-phosphate, thomasite and the satd. silicate found by Blome form a 2nd group parallel to the 1st and of much more importance. It is idle to attempt distinctions between slags by considering exceptional segregations, which logically should not occur at all, or are the result, in any case, of abnormal cooling. E. C. LATHROP.

The Work of the Experiment Station at Nantes. MAIZIÈRES. *Engrais*, 26, 1020–3.—A report of the work the station has done in regard to fertilizer control, and for the prevention of fraudulent fertilizers. E. C. L.

Principles of Fertilizing. D. DONON. *Engrais*, 26, 1161–3.—A review of the old ideas for the use of mineral fertilizers. E. C. LATHROP.

Why Chemical Fertilizers have not Given Satisfactory Results. RAFAEL M. TELLO. Mexico. *Mem. y rev. soc. "Antonio Alzate,"* 29, 29–42.—Discussion. H. S. PAINE.

How Contact Insecticides Kill. GEO. D. SHAFER. Mich. Agr. Col. Exp. Sta., *Tech Bull.* 11.—While contact insecticides do not depend upon one property alone for their effectiveness, yet usually one property is predominant. Alk. washes, $HgCl_2$ and other washes which can dissolve or ppt. constituents of insect tissue, penetrate the chitin of insects slowly, but at a rate proportionate to the weakness of their surface tension, and the thinness of the chitin. Gases and vapors penetrating the chitin, especially through the tracheae, act much more rapidly than liquids. Thus the volatil portions are the most effective in the case of kerosene, gasoline, creolin and pyrethrum. Vapors of gasoline, kerosene, CS_2, etc., after absorption seem to prevent O absorption. Lime-S softens the wax around such insects as the San José scale, and is of value therefore as a special contact insecticide in such cases. WM. P. GARRETY.

Growth of Plants by Electricity (COOK). 4.

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U. S., 1,011,909, Dec. 19. A. BRETTEVILLE. **Making dicalcium phosphate fertilizers.**

U. S., 1,012,251, Dec. 19. A. A. FORBES. **Making fertilizer having fish refuse as a base.**

16. FERMENTED AND DISTILLED LIQUORS.

ROBERT WAHL.

Yeast Wine (Trub-Wein). W. J. BARAGIOLA. Wädenswil. *Schweiz. Wochschr.*, 49, 519–23.—Tabulated analytical results to show distinctive difference between grape and pear wine on one hand, and the corresponding yeast wines (obtained by pressing out the yeast) on the other. S. WALDBOTT.

Researches upon the Acid Reversion in Wine. TH. OMEIS. *Arb. kais. Gesundh.*, 39, 434–49; cf. *C. A.*, 5, 560.—An account of expts. investigating the loss of acidity in wines as effected by different cellar treatments, carried on during 1909–10. Both natural must and that to which 20% of sugar soln. (76° Och.) had been added were used and the effect of temp, wild yeast, shortening the fermentation and sulfuring casks were tried. E. M. CHACE.

Similar Researches on Acid Reversion in Unsweetened and Sweetened Wine of 1909. Vintage of the Palatinate. HALENKE AND KRUG. *Arb. kais. Gesundh.*, 39, 450–70; cf. *C. A.*, 5, 560.—The work is confined to the effect of the addition of dry sugar, and of its solns., to both white and red musts. E. M. C.

Results of Official Wine Statistics—Annual Report, 1909-10. I. Wine Statistics. *Arb. kais. Gesundh.*, 39, 1–170.—The introduction gives an account of the questions discussed at the meeeting of the Wine Statistics Comm. in Treves during September, 1910 and is followed by complete reports from 6 expt. stations giving tables of analyses and discussions of the results on nearly 800 samples of wine from grapes grown in Prussia, Bavaria, Wurttenburg, Baden, Hesse, Alsace and Larraine. **II. Must Statistics.** *Ibid.*, 170–433.—The work is similar to that on wine, covering the same region, some 2000 analyses being given with elaborate discussion of results.
E. M. CHACE.

Limits of Sulfuric and Sulfurous Acids in Wine. H. GÜTH. *Pharm. Zentr.*, 52, 1223–6.—The contents of SO_3 vary from 0.06 to 4.0% mainly due to plastering. The limits of SO_2 prescribed by the various governments are mostly 300-350 mg. per l. though some are as low as 20, and others as high as 500. A. VORISEK.

Determination of Phosphorus in Wine. J. DORMANE. *Ann. chim. anal.*, 16, 413–18.—The figures for total P. obtained by means of calcination in a current of air are always a little higher than those arrived at by the wet way with HNO_3. It is not necessary to enlarge upon the advantages of the method of Berthelot which eliminates the extraction of the organic constituents in the Soxhlet, or other app. by means of alc. or ether. C. A. NOWAK.

The Degree of Acidity of Wine. A Study of Different Indicators. F. REPITON. *Ann. fals.*, 4, 578; cf. *C. A.*, 5, 3118.—Phenolph. is the only indicator sufficiently sensitive and suitable for use with the weakly acid substances existing in wine. The difficulty offered by the natural color of red wines which usually obscure the end point is overcome by the use of fluorescein together with phenolph. as an indicator. The green fluorescence of the fluorescein in alk. soln. covers the natural red color of the wine in such a way that the end point with phenolph. becomes sharp. To 5 cc. of wine add 5 drops of phenolph. (7 g. in 90 cc. of 95% EtOH), 3 drops of fluorescein (1

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in 100 cc. of 95% EtOH), and 5 cc. of recently boiled and cooled water. Heat the mixt. to 50° and titrate while hot with 0.05 *N* NaOH. A. F. SEEKER.

Quartz as Substitute for Platinum in Direct Determination of Extract and Mineral Matters in Wines. CH. ARRAGON. Lausanne. *Schweiz. Wochschr.*, 49, 633–5.—The question of employing either Pt or quartz dishes in detg. ext. in wines is insignificant in comparison with the discrepancies in employing either the direct or the indirect method for detg. ext. in the same kind of dish. The official requirement for a Pt dish of "normal" size should be modified to allow the use of quartz.
S. WALDBOTT.

What is Beer? R. WAHL. *Am. Brewers' Rev.*, 25, 606–7.—A technological retrospect in search of a definition or standard of beer. C. A. NOWAK.

Relation between Mash Concentration and Final Attenuation. O. PANKRATH. *Wochenschr. Brau.*, 28, 461–7, 491–1.—By chosing the proper conc. of mash and by employing an initial temp. below 65° (in infusion mashing) it is possible to produce worts of any desired final attenuation. The temp. between 60 and 70° may be traversed at uniform rate of increase. This further makes it possible to lower the final attenuation to the required degree in the case of such worts as have a tendency to excessive attenuation. A similar result is obtained with the spring-mashing process, provided the proper conditions are observed. Owing, however, to the delicacy of the process a modification has been introduced in which only a portion of the mash is so treated. The mash conc. process offers the advantages that the desired final attenuation is attained with more certainty since the addition of 1° Balling occasions only a slight change in the final attenuation. Unfortunately worts so obtained show unsatisfactory fermentation. The prep. of very thick mashes also encounters various technical difficulties. P. suggests the possibility of dividing the material for the mash into 2 parts, husks and kernels, and using the light wort from the easily extractible husks for mashing the meal from the kernel. C. A. NOWAK.

Cleaning and Desinfecting Brewery Apparatus and Utensils. ANON. *Allgem. Brauer and Hopfen Ztg.*; through *Z. ges. Brauw.*, 34, 495.—"Pyricit" is recommended as an exceptionally active germicide and desinfectant for use in the brewery. Its germicidal power is very high, *i. e.*, about 4 times as strong as that of carbolic acid. Even 0.5% solns. are germicidal in their action. It does not attack rubber, metal, etc., and is odorless. C. A. N.

The Mash Filter. W. WINDISCH. Alsace-lorraine Brg. Assoc. *Wochenschr. Brau.*, 28, 481–9.—Th mash filter is quicker and more reliable than the false bottom. It saves time and increases the productive capacity of a brewing plant. It enables very dry malt to be worked, whether fresh from the kiln or storage silo. The operations in the brewery can be harmonized with the working of the steam plant. The amt. of sparging liquor required is smaller, though the max. yield is obtained. The wort runs brighter from the mash filter than from the false bottom. The defects pointed out by Schifferer have been reduced practically to nil. The mash filter has practically no influence on the flavor of the beer as has been feared. C. A. NOWAK.

Variations in Acid Content and their Influence on the Keeping Qualities of Beer. F. SCHOENFELD AND W. HIRT. *Wochenschr. Brau.*, 28, 467–72, 489–91.—Acid has a protective influence on beer, increasing with the amt. added and acting in the first place on the bacteria and then on the yeasts. In spite of this fact smaller quantities are more beneficial and to be preferred inasmuch as they do not cause such extensive pptn. of the hop resins and consequent turbidity. In practice it would be impossible to produce in the process of manuf. the same amt. of acid as is found most suited in lab. tests. A somewhat higher % of acid is desirable and should be aimed at in order

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to ensure complete pptn. of the substances causing sediment during the period of storage prior to filtration. C. A. N.

Action of Oxygenated Water on the Steeping and Germination of Barley. E. WINCKLER. *Brasserie et malterie;* through *London Brewers' J.*, 47, 642–3.—These expts. show that in the case of aerated water the radicles are compelled to go far afield in order to procure the O necessary to the unfolding of life in the corn and consequently become developed to an extraordinary extent, whereas in the presence of H_2O_2, a superabundance of O is placed at their disposal, and hence they do not develop further. C. A. N.

Detection of Saponin and Glycyrrhizin (BEHRÉ). 12.

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17. PHARMACEUTICAL CHEMISTRY.

VIRGIL COBLENTZ.

The Determination of Codeine in Opium. ALBERT E. ANDREWS. *Analyst*, 36, 489–90.—The methods of Von der Wielen (*Pharm. Ztg.*, 48, 267 (1903)) and of Caspari (*Apoth. Ztg.*, 19, 874 (1904)) for the estn. of codeine in opium are unsatisfactory. The author proceeds as follows: Completely extract 12 g. dry opium with a small quant. H_2O, dil. to 100 cc., add 20 cc. of 20% Pb subacetate, let stand over night and filter, preferably under suction, through a Buchner funnel. Pass H_2S through 100 cc. of the filtrate, filter off the PbS, collect the filtrate in a 200 cc. Erlenmeyer flask and remove the H_2S with a current of air. Wash the ppt. with H_2O, conc. the washings separately and add to the main liquid keeping the vol. below 130 cc. To this add 20 cc. 20% Na salicylate and agitate. Filter off the liquid from the resinous ppt. into a beaker into which thebaine salicylate crystals have been added. Stir well, rubbing the beaker with a rod to facilitate the sepn. of the thebaine salicylate. Let the liquid stand over night then pass it again through the same filter and repeat this until no further deposition takes place. Wash freely with H_2O in the same filter, conc. the total filtrate on a H_2O bath to about 10–15 cc. and transfer while warm to a separator using a little H_2O to rinse the dish, transferring the final washings to a second separator. Sep. all Et_2O-sol. substances in the main liquid by agitation with ether using the same ether in the 2nd sepn. Repeat this extraction 3 times, add the aq. portion in the 2nd separator to that in the first and add to it 10 cc. of a 20% soln. of NaOH. Ext. this alk. soln. 4 times with more than an equiv. vol. of ether. Collect the ether in a second separator, wash with 20–30 cc. H_2O and transfer to a dry flask and dry it by adding anhydrous Na_2SO_4, then distil down to a few cc. and allow the codeine to crystallize by spontaneous evap. Dry, preferably *in vacuo*, and weigh. Check by titration using litmus or Me-red as an indicator. The volumetric results, which are more reliable, are a little lower. V. K. CHESNUT.

Colorimetric and Physiological Estimation of the Active Principle of the Suprarenal Gland. W. HALE AND A. SEIDELL. *Am. J. Pharm.*, 83, 551–8.—0.01 g. is treated with 5 cc. dil. HCl and 5 cc. KIO_3 (0.2%), heated just to b., allowed to stand 15 min., filtered and the color compared with a series of standards. The latter are made up from a mixt. of K_2PtCl_6 and $CoCl_2$ solns. which develop a color similar to that given by epinephrine and KIO_3, and which have been previously standardized against the ash-free active principle. The yellowish extractive matter present in the aq. soln. interferes with the test but is obviated by using the small quantity of the sample and not diluting. The method gives a lower % than is obtained by the physiological method but in all cases the figures are parallel. H. C. FULLER.

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The Pharmacopeial Assay of Citral in Lemon Oil. J. R. RIPPETOE AND L. E. WISE. *Am. J. Pharm.*, 83, 558–62.—The results obtained with the present U. S. P. method are too high owing to the estn. of citronellal and the procedure is unsatisfactory. It is suggested that Hiltner's metaphenylenediamine colorimetric method might be substituted with advantage as it gives more accurate results and is less troublesome. H. C. F.

Factory Control of Camphorated Oil with the Aid of the Saccharimeter. H. NORTH. *Am. J. Pharm.*, 83, 563–4.—A curve has been plotted showing the saccharimeter readings for camphor in cottenseed oil and can be used with advantage in the manuf. of camphorated oil in order to check the comp. of the finished product. H. C. F.

Liquor Magnesii Citratis. M. D. ALLEN. *Am. J. Pharm.*, 83, 564–6.—As ordinarily made the soln. soon becomes unsightly owing to fungous growth. This may be avoided by subjecting the bottles after they are filled and sealed to the temp. of b. water for $^1/_2$ hr. H. C. F.

The Determination of Nicotine in Nicotine Solutions and Tobacco Extracts. R. M. CHAPIN. U. S. Dept. Agr. Bur. Anim. Ind., *Bull.* 133.—The silicotungstate method of Bertrand and Javillier was found superior to the Kissling method in accuracy, convenience, economy, simplicity and rapidity. Codified directions for analyses by this method are given. WM. P. GARRETY.

Investigation of Prussic Acid and Benzaldehyde Solutions with Reference to Cherry-laurel Water. P. H. WIRTH. Utrecht. *Pharm. Weekblad*, 48, 1049–59, 1065–78.—A series of accurate chem. studies in which methods of analysis and purities of substances were carefully tested, and which yielded for solns. containing % of HCN, etc. of the same magnitude as cherry-laurel water the following results: The reaction $C_6H_5COH + HCN \rightleftarrows C_6H_5COHHCN$ in H_2O soln. was verified. In the prep. of cherry-laurel water by distillation HCN and C_6H_5COH only appear in the distillate. At the end point of their union about $^1/_4$ of the total HCN (0.1%) is free. V. E. HENDERSON.

The Alkaloids of Fly-agaric and Artificial Muscarine. J. HONDA. Lab. f. exp. Pharm., Strassburg. *Arch. exp. Path. Pharm.*, 65, 454–66.—In the prep. of natural muscarine fly-agaric, 2 new alkaloids designated as *α-* and *β-myketosine* were isolated. The dil. alc. ext. of the fungus was pptd. with basic $Pb(AcO)_2$ and $Ba(OH)_2$, filtered and washed with water. The filtrate and wash water were neutralized with H_2SO_4, alc. removed in vacuum, H_2SO_4 added and the filtrate pptd. by phosphotungstic and sulfuric acids. The decomp. ppt. was converted into the sulfates and by repeated extraction with 95% alc. freed from any muscarine pptd. with the phosphotungstic acid. The residue contained the sulfates of the 2 alkaloids. To sep. them the HCl salts were treated with dry $PtCl_4$ stirred up with abs. alc., and then treated further with alc. and ether till pptn. was complete. The ppt. was dissolved in hot water and warm alc. added to cloudiness. *α*-Myketosine seps. on cooling. The *hydrochloride* was also obtained. From the filtrate the *β*-base was pptd. with phosphotungstic acid and obtained as the non-cryst. *carbonate*. After removal of phosphotungstic acid choline and muscarine were pptd. from the above filtrates by $BaHgI_4$. This ppt. was decomp. by Ag_2CO_3 and the soln. of bases converted into the acid tartrates. From this the acid tartrate of choline was obtained. From the mother liquor, after further pptn. with $BaHgI_4$, muscarine was obtained free from choline. The myketosines were without marked physiological action on frogs and rabbits. The pharmacological testing of the natural and artificial muscarines on *R. temporaria* and *R. esculenta* showed their action to be qualitatively the same but that of the natural stronger. WALTER A. JACOBS.

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Theory and Modification of the Malaquin Reaction for Characterizing Strychnine. G. DENIGÈS. *Bull. soc. chim.*, **9**, 537–42.—The mechanism of the Malaquin reaction is to reduce strychnine by Zn and HCl. In this way strychnine is transformed partly into tetrahydrostrychnine and partly into strychnidine. Treating these with oxidizing agents, a red color is produced. Add to 4 cc. H_2O 5–10 mg. strychnine, 4 cc. HCl (d. 1.18) and 2–3 g. amalgamated or purified Zn, b., allow to stand for 3–4 min., then decant and cool. To 2 cc. of this soln. add 1 drop of a 0.1% $NaNO_2$ soln. and shake; a red color appears. Then mix in another tube 1 cc. conc. H_2SO_4 with 1 drop of a 0.1% KNO_3 soln. and add 2 cc. of the hydrostrychnine soln.; the same red color will appear. To the remainder of the hydrostrychnine soln. add 1–2 drops of a cold satd. Br water; after shaking, a beautiful red color appears. W. REGNAULT.

Some Observations on Essential Oil Plants and their Essences. A. W. K. DE JONG. *Rec. trav. chim.*, **30**, 211–9.—The oils are obtained by distilling the leaves in a current of steam and then chilling the distillate, when the oil seps. out. The water in the receiver is thrown back into the retort and the distillation is begun anew. This is repeated until no more oil seps. out. By this method the following facts were ascertained. The leaves of Singapore patchouli, *Pogostemon tomentosus*, Hassk(?), whether old or young, contain about 8–9 cc. of oil per 100 g. of dried substance. The branches contain 0.4 cc. of oil and the roots 0.75 cc. of an oil heavier than water. The age of the leaves of Java patchouli practically does not influence the amt. of oil yielded by them. The dried leaves of this plant yield as much oil as the fermented ones, and about 3 times as much as the fresh ones. Therefore the oil is not produced by fermentation, as is generally supposed. The fresh leaves yield less oil than the dried ones, because the oil cells are distributed evenly throughout the leaf. When the fresh leaves are distilled, only the oil in the exterior cells is gotten out. During the drying, the cell walls shrivel and are broken, thus allowing the oil to transude to the exterior. Bruising the leaves also produces a greater yield of oil. The oil or essence is not produced by the action of an enzyme, for after being thrown into b. water the leaves yielded even more oil than before, for the cell walls had been softened by the hot water.

WALTER REGNAULT.

Explanation of the Technical Analytical Methods of the German Pharmacopeia, V Edition, 1910. GEORGE HEYL. *Apoth. Ztg.*, **26**, Nos. 44–52. A. S.

Applied Plant Microchemistry. II. The Detection and Localization of Andromedotoxin in Ericaceen. O. TUNMANN. *Apoth. Ztg.*, **26**, 555; cf. *C. A.*, **5**, 2695.—The localization of andromedotoxin is best accomplished upon a prep. free as possible from tannin and glucoses, by means of HCl vapor and the careful warming with P_2O_5.

A. SEIDELL.

Liquid Sulfur—Sulfume. ANON. *J. Am. Med. Assoc.*, **57**, 1853.—This nostrum was found to contain per 100 cc. about 1.0 g. S in the form of thiosulfate and 4 g. in the form of polysulfide; there was also found 2.55 g. CaO. Such a soln. would be produced by b. in water a mixt. of lime and S. A. SEIDELL.

Tiz. A Cure for "Smelly Feet" and other Things. ANON. *J. Am. Med. Assoc.*, **57**, 1853.—The analysis gave results showing the % comp. of "Tiz" tablets to be approx. as follows: Alum 60, tannic acid 10, salicylic acid 5, talcum 5, starch 20.

A. SEIDELL.

Oxidaze. The Latest Name of the Odoriferous Sugar Cure for Consumption. ANON. *J. Am. Med. Assoc.*, **57**, 2154.—This nostrum consists essentially of sugar containing a small amt. of volatil oils, starch and a trace of KI. A. SEIDELL.

Dekofa. A Caffeine-poor Coffee. ANON. *J. Am. Med. Assoc.*, **57**, 37.—

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Analyses confirmed the claims of the exploiters that this product contained approx. only 0.15% caffeine. A. SEIDELL.

The Determination of Caffeine in Caffeine-Sodium-Salicylate and Similar Preparations. F. LEHMANN AND A. MÜLLER. *Apoth. Ztg.*, **26**, 647.—The Ger. Pharm. method of shaking out the aq. soln. of caffeine-Na-salicylate with $CHCl_3$ gives low results unless an excess of NaOH soln. is used. When NaOH is used the $CHCl_3$ ext. must be washed a few times with H_2O before evapg. to obtain the caffeine residue for weighing. A. SEIDELL.

Drug Commerce of Hamburg. O. TUNMANN. *Apoth. Ztg.*, **26**, 568, 579; cf. *C. A.*, **5**, 2696.—Seed. A. S.

Liquor Ferri Albuminati. R. LILLIG. *Apoth. Ztg.*, **26**, 589, 597, 605, 620, 638, 648, 659.—A detailed historical review of the numerous methods for its prep. and for the detn. of its Fe content is given. Among the requisits for obtaining a good product are, completely $FeCl_3$-free dialyzed liquor ferri oxychlorati, fresh albumin, of which, on account of its variable water and alkali content, the necessary quantity for the pptn. of the liquor ferri oxychlorati must be detd. by a preliminary expt. Boiled dist. water, cooled to 50°, must be used. The mixt. must be always slightly acid to prevent the soln. of the ferri albuminate. A linen cloth filter hastens the filtration. The washing with H_2O at 50° must be continued until the wash water gives no further reaction for chloride. Since carbonates and chlorides of the alkalies influence the solubility of Fe albuminate it is necessary that NaOH free of these impurities be used. The washed, still moist Fe albuminate ppt. is dissolved immediately, without warming, in the very dil. NaOH soln. The properties and chemistry of liquor ferri albuminati are described. The literature upon the preservation, dosage and therapeutic, biological and serological properties is finally discussed. A. SEIDELL.

The Testing of Drugs According to the German Pharmacopeia, 5th Edition. S. FRERICHS AND E. MANNHEIM. *Apoth. Ztg.*, **26**, 544, 613.—Suggestions and criticisms. The II installment discusses in great detail the detn. of morphine in opium and opium preps. A. SEIDELL.

Thacher's Worn Syrup. A Dangerous Santonin Mixture. ANON. *J. Am. Med. Assoc.*, **57**, 235.—This prep. contains 1.14 g. santonin per 100 cc. A fatal case resulting from the administration of this prep. is reported. A. SEIDELL.

Iodonucleoid. An Iodine Product under a Misleading Name. ANON. *J. Am. Med. Assoc.*, **57**, 309.—By analysis there was found 0.79% P, 0.43% Ca and 24.2% I. Additional tests indicated that the I was present in combination with casein and not with nuclein. A. SEIDELL.

En-ar-co Oil. A Poisonous Nostrum for Curing Rheumatism and Making Hens Lay. ANON. *J. Am. Med. Assoc.*, **57**, 407.—Exam. showed the presence of EtOH, isoamyl alc., capsicum and a volatil greenish oil. Without making an exact sepn. it is concluded that about 90% of the prep. consists of "fusel oil." A. SEIDELL.

Liquid Life. W. A. PUCKNER AND L. E. WARREN. *J. Am. Med. Assoc.*, **57**, 495.—The quant. analysis showed the following comp. in g. per 100 cc. of the aq. soln.: Quinine sulfate 0.0566, $ZnSO_4$ (cryst.) 0.2416, $MgSO_4$ (cryst.) 13.34, Na_2SO_4 (cryst.) 6.17, saccharin trace. Special attention is called to the fraudulent character of this nostrum. A. SEIDELL.

Jaroma. A New, Euphonious Name for an Old, Ill-smelling Drug. ANON. *J. Am. Med. Assoc.*, **57**, 835.—This nostrum consists of tablets containing asafetida, gypsum and capsicum. A. SEIDELL.

New and Non-official Remedies. COUNCIL ON PHARMACY AND CHEMISTRY. *J. Am. Med. Assoc.*, **57**; cf. *C. A.*, **5**, 2898. A. S.

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The Purity of Nitrous Oxide. W. R. SMITH AND E. D. LEMAN. *J. Am. Med. Assoc.*, **57**, 577.—Four samples of com. liquid N_2O were analyzed with the following results in %:

Source.	N_2O.	O.	N.	CO_2.
Johnson and Lund	95.4	0.0	4.6	0.0
Ohio Chem. and Mfg. Co	93.4	1.4	5.2	0.0
Lenox Chem. Co	95.8	1.1	3.1	0.0
S. S. White Dental Mfg. Co	96.1	0.1	3.5	0.3

A. SEIDELL.

Quinine Tannate. COUNCIL ON PHARMACY AND CHEMISTRY. *J. Am. Med. Assoc.*, **57**, 1303.—Four com. samples of quinine tannate were found to contain from 29.3 to 33.97% of anhydrous quinine. A standard of 29% quinine is recommended and an increase of this to 30% beginning with 1913 suggested. A. SEIDELL.

Calcium Phenolsulfonate. W. A. PUCKNER AND L. E. WARREN. *J. Am. Med. Assoc.*, **57**, 1383.—The exam. of 4 com. samples showed that this product contains considerably less water than corresponds to the usually quoted formula with 1 mol. of H_2O of crystn. A. SEIDELL.

Hesperian Tonic. A Misbranded Nostrum Sold as a Cure for Diphtheria. ANON. *J. Am. Med. Assoc.*, **57**, 1780.—This prep. is a water-alc. soln. of $FeCl_3$ with decomp. products of spirits of nitrous ether, probably present originally. A. SEIDELL.

The Active Constituents of the Indian Solanaceous Plants, Datura stramonium, D. fastuosa and D. metel. A. E. ANDREWS. *J. Chem. Soc.*, **99**, 1871–7.—Tests were made on plants growing wild. Preliminary to isolation the extracted alkaloids were sepd. into 2 parts by extraction with Et_2O and $CHCl_3$ from the mixt. made slightly alk. with NH_4OH. Only small quantities of atropine were found in *D. metel* (chloroaurate m. 135–40°); the alkaloid recovered was optically non-active. Hyoscyamine and scopolamine were isolated and identified. *D. stramonium.* Total alkaloids in roots and stems, 0.19–0.26%; leaves and fruits, 0.38–0.45%. *D. fastuosa*, black variety from Assam. Twigs and leaves, total alkaloids 0.119%, scopolamine and hyoscyamine, 4 : 1; roots, total 0.101%, scopolamine only; fruits, total 0.202%, scopolamine only. All contained a small quant. of an amorphous alkaloid, not atropine. *D. metel* from Punjab. Leaves, total 0.22%, scopolamine and little atropine; seeds, 0.21–0.23%, hyoscyamine and scopolamine, 2 : 1, traces of atropine; capsule, 0.10% scopolamine only. A. VORISEK.

The Composition of Tincture of Ginger. H. C. LYTHGOE AND L. T. NURENBERG. *J. Ind. Eng. Chem.*, **3**, 910–2.—Total solids and water-sol. solids of tincture of Jamaica ginger prepared from alc. of varying % increase as the % of alc. decreases. Alc.-sol. solids are nearly const. for 70% alc. and over but decrease as well as the % of volatil oil with the alc. %. The terms "Tr. Ginger U. S. P." and "ext. of ginger" are regarded synonymous. Ext. of ginger made from the oleoresin with 95% alc. does not differ from that made from the rhizome but is inferior when weaker alc. is used. A. V.

The Assay of Digestive Ferments. H. T. GRABER. *J. Ind. Eng. Chem.*, **3**, 919–21.—The white of fresh egg shows a max. digestibility by pepsin when the egg is 5–7 days old. Slight variations in the % of HCl used markedly influence the quantity digested. The amylolytic action of pancreatin varies with the kind of starch used. A method for the detn. of fat-splitting action of this ferment is given and recommended. Papain is best standardized by raw beef in acid (0.3% HCl) medium. In the valuation of rennet the influence of milk as regards its source, comp., presence of inorganic salts (Ca), the temp. at which kept before and during assay, and the order of mixing with the ferment must be considered. A. VORISEK.

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Synthetic Perfumery Products. J. C. UMNEY. *Perf. Ess. Oil Record*, 2, 134–5.—The science of perfumery is one of the most delicate branches of chemistry. The products must often be "olfactorily" pure, for, analytically indeterminable traces of impurity sometimes alter or completely spoil the odor. These impurities often unnoticeable at first, may react in the perfumes themselves and transform the products. Classified, the products are: (I) *Alcohols:* (*a*) Phenyl ethyl alc., (*b*) cinnamic alc., (*c*) benzyl alc., (*d*) linalol, (*e*) rhodinol, (*f*) terpineol. (II) *Aldehydes and Ketones:* (*a*) Acetophenone, (*b*) duodecylic ald., (*c*) anisic ald., (*d*) benzaldehyde, (*e*) citral (3 types), (*f*) citronellal, (*g*) methylacetophenone. (III) *Musks, artificial:* Three types are made: (*a*) In small crystals m. 113°, (*b*) musk ketone 100%, m. 135, (*c*) musk ambret, m. 85°. (IV) *Esters:* (*a*) Acetates: (1) benzyl, (2) geranyl, (3) linalyl, (4) phenylethyl acetate, (5) rhodinol acetate; (*b*) benzoates: (1) amyl, (2) benzyl, (3) ethyl, (4) methyl; (*c*) salicylates: (1) amyl, (2) benzyl, (3) ethyl, (4) methyl. Irisones are of many varieties. Among the blended products are given: Ambrein, chevrefeuille, dianthus, cardinol, giroflée, Jacinthea, jasmine, neroli, and trefoline.

A. VORISEK.

Medicinal Tablets with Particular Regard to their Examination. E. SEEL AND A. FRIEDERICH. *Pharm. Zentralhalle*, 52, 991–8, 1055–62, 1087–91, 1115–21.—The tablets examd. were those of aspirin, $BiONO_3$, $HgCl_2$, HCOH, hydropyrin, pyrenol, salipyrin, urotropin and others containing the so-called "substitutes" for some of these. Considerable literature is quoted. Aspirin or pure acetyl salicylic acid is not decomposed into its constituents by 0.3% HCl soln. (acidity of gastric secretion) as is the case with impure products. The m. p., 135°, of the Ger. Pharm., instead of 137°, permits impurities to be present. The results of the exam. point to these conclusions: Tablets must be tested for physical properties especially as to the rapidity with which they disintegrate in water or acid media. Substitutes were found insufficiently pure, deficient in wt. and in the quantity of the active ingredients (dose). Many are not properly kept and harden on keeping and suffer loss of active ingredients.

A. VORISEK.

Physical and Chemical Properties of Hungarian Oil of Spearmint. K. KIRK. *Pharm. Zentr.*, 52, 1111–4.—The fresh plant, *Mentha crispa*, Hung. yielded 0.53%, when dried, 2.48% of an oil of straw-yellow color, often greenish, which turns darker and thick on exposure to light. The odor is characteristic and differs from other spearmint odors. D_{15} 0.9375–0.9513, d_{20} 0.9328–0.9463, $[\alpha]_D^{15}$ —44.38° to —49.85°, n_D^{15} 1.4914–0.4949, n_D^{20} 1.4899–1.4931. Alc., 80%, dissolves 1 part, 90% 0.5 part of the oil; 59 to 63.4% distil at 220–30°. Carvone content, 62–71%. A. VORISEK.

Combinations of Urotropin. G. COHN. *Pharm. Zentr.*, 52, 1173–9, 1230–6.—Combinations of hexamethylenetetramine with I, phenols, acids, metallic salts, alkyl haloids, and certain other organic substances are described. Many of them are known and used under trade names. A. VORISEK.

Preparation of Fluid Extracts by Expression. L. KROEBER. *Pharm. Zentr.*, 52, 1261–4.—For the extraction of cascara sagrada, frangula, condurango and gentian the Bruns method of successive pressing gave satisfactory results when compared with the products obtained by percolation. The comparison was based on the d. and the % of solid ext., but no statements are found concerning their therapeutic efficiency.

A. VORISEK.

Pyroanalysis of Powdered Drugs. ROSENTHALER. *Ber. pharm. Ges.*, 1911, No. 6; through *Schweiz. Wochschr.*, 49, 635.—An extension of the principle of "microsublimation" of small amts. of powd. drugs such as cort. chinae, folia uva ursi, cort. frang., cort. casc. sag., rhiz. rhei, gallae, rhiz. hydrastis, opium, cubebae, semen calab.,

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piper nigr., fruct. anisi. These, when heated in a vacuum, gave characteristic sublimates which are illustrated and described. S. WALDBOTT.

Terminology and Classification in the Pharmaco-chemical System of Drugs, Especially the Carbohydrate Group. A. TSCHIRCH. *Ber. pharm. Ges.*, 1911; through *Schweiz. Wochschr.*, 49, 444–9.—In works on pharmacognosy, drugs are usually classified from the purely botanical point of view. This excludes drugs of animal origin; even gums, resins and exts. are difficult to place. T. advocates a purely chem. classification which will bring together drugs related chemically, *e. g.*, honey, figs, dates, bassia blossoms; or milk, cane, beet and palm sugars. The old classif. would assign each of these drugs to a different plant family, and partly to diff. morphological groups. T. has classified drugs into those contg. alkaloids, glucosides, resins, essential oils, dyestuffs, tannins, fats, albuminoids, acids. Animal drugs range themselves naturally among these. More difficult is the systematic classif. of carbohydrates, of which, however, a comprehensive outline is given. SIGMUND WALDBOTT.

An Indian Arrow Poison; and a Poison from the Skin of Rana esculeata. W. CASPARI AND A. LOEWY. *Medizin Klinik*, 1911, 1204; through *Schweiz. Wochschr.*, 49, 644–5.—The secretion of the skin of frogs subjected to strong faradic current has paralyzing properties similar to those of the arrow poisons used by the Indians of Colombia. They obtain it by impaling live frogs on thorns and using the secretion. The skin of frogs contains the poison pre-formed. S. WALDBOTT.

Gleanings from the Lesser Writings of C. Clusius. H. CHRIST. Basel. *Schweiz. Wochschr.*, 49, 457–64, 469–76, 485–9, 497–501, 513–9.—Historical notes on some of the important botanical contributions of the New World, such as tobacco, coca, spices, drugs, the potato, etc., from writings of Clusius (1601, 1605). S. WALDBOTT.

Ergot of Elymus arenarius. K. AMBERG. Pharm. Lab., Eidg. Polyt., Zürich. *Schweiz. Wochschr.*, 49, 489–90.—Hartwich in 1895 (*Schweiz. Wochschr.*, Heft 2) found 0.8101% alkaloid in ergot of *Molinia microcephala* (Wallr.) Wint., while Keller found 0.245% in small Russian ergot of *Claviceps purpurea*, Tul., 0.225% in Austrian and only 0.095% in large Swiss ergot. Some well developed and matured sclerotia grown on *Elymus arenarius* differed very little in appearance from small Russian ergot of rye. They are not as deeply furrowed as the latter, are but little curved, more slender and attain a max. length of only 25 mm. Microscopical exam. showed the usual dark cortical layer, and an abundance of oily drops in the hyphae. The material yielded to petroleum ether 29.35% fat, and contained 0.105% cryst. alkaloid which gave the characteristic color test for ergotinine. S. WALDBOTT.

Exact Determination of Nicotine in Tobacco and Green Plants of Nicotiana tabacum. R. KISSLING. Bremen. *Schweiz. Wochschr.*, 49, 537. Reply to R. Mellet (*C. A.*, 5, 2382, 3861).—K. refers to his new method of detg. nicotine briefly described in Post's *Chemisch-technische Analyse*, recent ed. It is based on pptn. of nicotone by means of mercuric potassium iodide, and detg. the alkaloid from the degree of turbidity produced. K. is still at work perfecting this method. S. WALDBOTT.

Apparatus for Sterilizing Flasks (FEIST). 1.

U. S., 1,004,034, Sept. 26. E. C. KAYSER. **Producing a catalyzer (for converting unsaturated fatty acids and their esters into saturated compounds).**

U. S., 1,012,788, Dec. 26. O. K. ZWINGENBERGER. **Making a solid composition containing a medicinal oil.**

U. S., 1,012,874, Dec. 26. D. F. LUCKEY. **Producing hog-cholera antitoxin.**

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U. S., 1,012,923, Dec. 26. W. SCHOELLER and W. SCHRAUTH. **Mercury-substituted esters of carboxylic acids.**

Brit., 9,359, Apr. 15, 1911. FARBWERKE VORM. M. L. & B. In the process of 7,204, of 1911 (*C. A.*, 6, 275), substituting the Me ester of a sulfonic acid for the dimethyl sulfate or the Me halide.

18. ACIDS, ALKALIES, SALTS AND SUNDRIES.

T. LYNTON BRIGGS.

The Manufacture of Sulfuric Acid by the Tower Method. MAURECOURT. *Engrais*, 26, 995–7. E. C. LATHROP.

Loss of Ammonia from its Solution. A. V. HENDRICKSON. *J. Gas Lighting*, 115, 592.—Samples of weak NH_4OH solns. were exposed in a room free from direct draft, and the loss of NH_3 detd. Containing vessels of 3 types were used: (1) Glass beaker, (2) small narrow-necked flask, (3) porcelain evapg. dish. The loss in % for solns. containing 13.09 g. NH_3 per l. and exposed for 2 hrs. at 70°, for (1), (2) and (3), resp., are: 8.5, 1.9, and 13.9. For solns. containing 18.7 g. NH_3 per l. and exposed for 40 hrs. at 75°, 73.21, 18.19 and 100. The loss is much increased by agitation. C. A. COLE.

Ammonium Sulfate from Shale. ANON. *Am. Fertilizer*, 35, 25.—It is understood that a plant for the manuf. of $(NH_4)_2SO_4$ from shale is to be established at Cape Breton, Nova Scotia. C. A. COLE.

Ammonium Sulfate; some Details of Manufacture. H. FISHER. *Progressive Age*, 30, 32–66; *Chem. Eng.*, 14, 490–3.—An illustrated description of a successful sulfate plant showing details and general arrangement is given with details as to the operation. E. C. SCOTT.

State of the Industry of Alum and Aluminium Sulfate. E. CAZES. *Rev. gén. chim.*, 14, 363–7. J. J. M.

Outlook of the Technical Chemist with Reference to the Chilean Saltpeter Industry. OTTO BOGS. *Chem. Ztg.*, 35, 1313–4. J. J. M.

A Powder Used for the Adulteration of Sulfur. DURIER. *Ann. fals.*, 37, 584.—The newly discovered adulterant is a fossil grain or powdered infusorial earth, which cannot be detected by the naked eye even when present in the proportion of 15%, but may readily be discovered by chem. or microscopical methods. It contains about 75% SiO_2 and gives at least 80% ash. As S contains not more than 2% ash this detn. will reveal the adulteration. Microscopical exam. of the original material or the ash shows the presence of diatoms. P. B. DUNBAR.

Chemical Industries in Sweden. THOMAS H. NORTON. *J. Ind. Eng. Chem.*, 4, 51–8.—Address. E. J. C.

The Characteristics and Chemical Composition of some Early Matches. E. G. CLAYTON. *Pharm. J.*, 87, 565; *Chem. News*, 103, 223–4.—The "friction lights" of John Walker were tipped in a paste of Sb_2S_5, $KClO_3$ and gum, and required vigorous rubbing between sand paper to cause ignition. S. WALDBOTT.

The Production of Oxygen in the Workshop. I. From Alkali Chlorates. AUG. S. NEUMARK. *Met. Chem. Eng.*, 9, 641–2.—Theory of catalyzers and sketch of barrels for washing gas are given. For external heating of retort use, by parts, chlorate 2, NaCl 2, Fe_2O_3 3 or chlorate 12, NaCl 6 and MnO_2 1. For internal heating use: 100 parts $KClO_3$, 40–60 MnO_2, 5–20 infusorial earth; 100 parts $KClO_3$, 3–5 powdered

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charcoal, 20–40 infusorial earth; or 500 parts $KClO_3$, 62 MnO_2 or Fe_2O_3, 4 lampblack. $NaClO_3$ is as good as $KClO_3$. H. V. MAIN.

Heat Transmission (GURNEY). 2.

U. S., 1,011,172, Dec. 12. E. C. ECKEL. **Obtaining potash and other potassium compounds from greensand.**

U. S., 1,011,173, Dec. 12. *Idem.* **Producing iron and potassium salts.**

U. S., 1,011,181, Dec. 12. J. GALEY and B. GALEY. **Coating paper, glass or other material.**

U. S., 1,011,421, Dec. 12. T. EYNON. **Making a phonograph record.**

U. S., 1,011,443, Dec. 12. W. A. KER. **Making imitation metal leaf and applying size to one side.**

U. S., 1,011,504, Dec. 12. C. A. SCHULTZ. **Abrasive.**

U. S., 1,011,650, Dec. 12. H. STAIER. **Making a substitute for phosphorus in matches.**

U. S., 1,011,804, Dec. 12. J. G. JONES. **Burning lime.**

U. S., 1,012,056, Dec. 19. A. E. BOSSE. **Ammonia generator.**

U. S., 1,012,272, Dec. 19. J. D. PENNOCK, E. C. WITHERBY, W. H. BLAUVELT, E. N. TRUMP and C. G. TUFTS. **Purifying ammonia.**

U. S., 1,012,273, Dec. 19. *Idem.* **Recovering purified ammonia from ammoniacal liquor.**

U. S., 1,012,421, Dec. 19. C. OPL. **Making sulfuric acid without lead chambers.**

U. S., 1,012,531, Dec. 19. G. EGLY. **Molded article containing silicon carbide, Si and agglutinant.**

U. S., 1,012,356, Dec. 19. L. R. HOFF. **Fabric for brake liners.**

U. S., 1,012,639, Dec. 26. I. F. HOLMGREN. **Determining the percentage of a substance in solution.**

U. S., 1,012,911, Dec. 26. A. POULSON. **Making gelatinous silica.**

19. GLASS AND CERAMICS.

G. E. BARTON, A. V. BLEININGER.

Glaze Construction. Volume Relationships. II. A. L. HOPKINS. *Trans. English Ceramic Soc.*, 10, 124–8; cf. *C. A.*, 5, 578.—The following at. vols. are stated: Al 10.5, Si (amorphous) 14.2 (cryst.) 11.4, O 14.3. The author assumes that the mol. vols. of Al_2O_3 and SiO_2 are the sum of the at. vols. of their constituent elements and gives reasons for supposing the at. vol. of Si in SiO_2 to be 14.2. From these data he concludes that the O strain (*C. A.*, 5, 578) is 2.0428 for Al_2O_3 and 2.0140 for SiO_2 so that right proportioning of the SiO_2 and Al_2O_3 in a glaze should materially reduce the "basic strain." This was applied to raw stoneware glazes maturing at cone 7: (*E*) K_2O 0.21, CaO 0.27, BaO 0.10, ZnO 0.42, Al_2O_3 0.48, SiO_2 3.0, and (*F*) K_2O 0.24, CaO 0.32, BaO 0.20, ZnO 0.24, Al_2O_3 0.46, SiO_2 4.4. In *E* the Al_2O_3-SiO_2 ratio is 1 : 6.24 and the total O strain 1.3779 while in *F* the ratio is 1 : 9.5 and the O strain 1.4111. Neither crazed, but glaze (1) made by substituting the RO elements of *F* in *E* crazed badly while glaze (2) in which the RO of *F* was replaced by the basic elements from *E* did not craze. The O strain in (1) was 1.2862 and in (2)

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1.4934 from which H. concludes that for this type of glaze the maximum O strain [*i. e.*, the minimum numerical value.—ABSTR.] is 1.3779 for the Al_2O_3–SiO_2 ratio of 1 : 6.25 and 1.4111 for a ratio of 1 : 9.5. In the substitution of coloring oxides no change need be made in the Al_2O_3–SiO_2 ratio unless the original base volume is increased. This same theory is being applied to low temp. (fritted) glazes.

H. K. CUMMINGS.

Blistering and Bubbling of Cornish Store. J. A. CALCOTT. *Trans. English Ceram. Soc.*, 10, 153–4; 1 diagram.—This fault is found only in mixts. of "buff" and "purple" stone and is probably due to unequal fusibility of the two, giving rise to the evolution of gases from the buff stone (less fusible) after surface vitrification due to the purple stone. May be avoided by the use of smaller proportions of stone, making the body more open. H. K. CUMMINGS.

What are the Best Types of Bricks and Settings for Frit Kiln Bottoms? A. LEESE, *et al. Trans. English Ceram. Soc.*, 10, 154–8.—There are 4 destructive elements: high temp., prolonged heating, contact with molten fluxes, heating up and cooling down. Shape, size and method of setting bricks as well as their comp. is important. The length of time a frit kiln lasts is also influenced by the character of the frit and the form in which borax, soda and other fluxes are introduced. The use of large blocks was recommended and for suitable materials, ball and china clay mixts. or either alone. Mr. Holdcroft suggested bauxite bricks and Dr. Mellor proposed the use of inexpensive natural clays found similar to ball clay in resistance to frits but free from dunting.

H. K. C.

What is the Cause and Prevention of "Chittered Edges"? A. G. RICHARDSON. *Trans. English Ceram. Soc.*, 10, 146–53.—Comparison of 3 associated faults: "chittered edges," "peeling," and "dunting." The difference between the 3 is largely a matter of degree, all being caused by overgrinding or short-calcining of the flint. Peeling is taken to mean flaking off of the glaze from the body while in the case of chittered edges cuts extend through the glaze into the body. These faults may also be due to over-charging of flint and peeling is sometimes caused by scumming. In the discussion considerable confusion arose from the different use of the terms "chittering" and "chittered edges." Chittering is a purely mechanical fault due to bad tools or manipulation, while the other is a body fault, as has been stated. H. K. CUMMINGS.

The Density of Silicate Mixtures. E. WARD TILLOTSON, JR. *J. Ind. Eng. Chem.*, 3, 897–900.—The factors (*w*) given by Winkelmann and Schott (see Hoverstadt "Jena Glass", 148) for calc. of d. of glass from % comp. do not hold for the new silicate mixts. made at the Carnegie Inst. and elsewhere. New factors (*t*) were detd. The values are: SiO_2 (*w*) 2.3, (*t*) 2.3; Al_2O_3 (*w*) 4.1, (*t*) 2.75; CaO (*w*) 3.3, (*t*) 4.1; MgO (*w*) 3.8, (*t*) 4.0; BaO (*w*) 7.0, (*t*) 7.0; Na_2O (*w*) 2.6, (*t*) 2.6; Si_2O (*w*) ——, (*t*) 3.7.

C. H. KERR.

Observations upon the Ignition Loss of Kaolins and Clays. R. RIEKE. Royal Porcelain Manuf., Berlin. *Sprechsaal*, 44, 638–41, 653–6.—A strong similarity appears to exist between kaolins and high grade fire clays, *i. e.*, both show a distinct temp. lag at 500° and a longer halting period at from 560–80°. Some ferruginous clays behave similarly to fire clays; others show practically no halting points. The loss of chem. H_2O begins only at 450°. The dissociation velocity increases rapidly with the temp. By heating sufficiently long practically all of the H_2O may be expelled between 400–500°. The last portions of the chem. H_2O are given off with difficulty. No indication was observed of the different behavior of the sep. OH groups of the $H_4Al_2Si_2O_9$. The loss of plasticity is not always parallel with loss of the constituent water.

A. V. BLEININGER.

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Behavior of Fused Silica at High Temperatures. A. BLACKIE. *Chem. News*, 104, 77–9, 86–8.—Vitreous silica may be obtained in two main types: (*a*) Transparent variety difficult to prepare but as clear as good glass, (*b*) opaque or translucent glass containing bubbles but easier to manufacture and equally good in most cases. One grade of (*a*) and three of (*b*) were tested. *Strength:* The test employed was transverse fracture of a beam. The samples were of the 4 types which had been previously subjected to constant high temps. for definit periods. Results show that transparent silica is in all cases much the stronger while the other grades differ among themselves. In general, the rate of loss of strength increases rapidly with the temp., above 1100° (cf. *C. A.*, 5, 1989). *Structure:* Typical fragments from the strength tests were examined with the polarizing microscope. Crystn. was seldom found to start from included quartz grains and at lower temps. (1000–1200°) was confined to the outer surface and walls of bubbles. Sometimes at 1275° and usually at 1353° a micro-cryst. structure began to develp (except in the transparent grade) and this is attributed to impurities in solid solution. The crystals are of tridymite; they are minute, increase up to 1118°, and become shattered at higher temps. Changes in strength follow closely the crystn. changes and the latter are accelerated by contact with air. Above the transition point of vitreous silica to tridymite, crystn. cannot be prevented entirely. The work confirms the conclusions of Day and Shepherd (*C. A.*, 1, 29). *Expansion:* For the coeff. of expansion of transparent fused silica see *C. A.*, 5, 1670. The expansion of rods of translucent or opaque varieties was compared by fusing them at one end to rods of transparent SiO_2 and observing the relative motion of the free ends by an optical lever method. The difference of coeffs. between the 2 varieties is negligible for practical purposes, being less than $^1/_5$ the difference in coeff. between Pt and lead glass at the softening point of the latter. H. K. CUMMINGS.

Why do Tiles of Six Inches and over Crack when Drawn from Biscuit Oven? H. BARRETT. *Trans. English Ceram. Soc.*, 10, 144–6.—This question refers not to dunting but to cracks produced during biscuit firing (fire-cracks). Cracking is not due to size but is more noticeable the larger the tile. It may be due either to heat treatment, method of setting, or comp. of ware. Precautions suggested: Care in drying, proper heat soaking, choice of shallow saggars and care in placing tile in them, and use of more plastic clay. H. K. CUMMINGS.

Standard Specifications for Retort and Firebrick Material. COMM. INST. GAS ENGINEERS. *J. Gas Lighting*, 114, 843–5; *J. Soc. Chem. Ind.*, 30, 804.—Supplements previous specifications (*C. A.*, 5, 979–80) but applies particularly to refractory materials made from clay containing less than 75% SiO_2. Complete chemical analysis is to be provided when required by purchaser. Material showing no sign of fusion at Seger cone 30 (about 1670°) is classed as grade 1, that standing Seger cone 26 (about 1580°) but not 30 is classed as grade 2; and each piece of material is to be stamped 1 or 2 (by a figure not less than an inch long) to indicate its grade. The max. linear contraction or expansion allowed after heating at Seger cone 12 (about 1350°) for 2 hours is 0.75% in grade 1 and 1% in grade 2. "Bricks of standard sizes shall not vary from specified dimensions by more than ±1.5% in length or ±2.5% in width or thickness," while special bricks, blocks or tiles are not allowed more than ±2% variation. The material must withstand a minimum crushing strain of 1800 lb. per sq. in., determined by placing a whole brick, with its long side vertical, between the jaws of an Avery machine giving a vertical thrust. The ends of the specimen are to be sawn or ground flat and parallel and not less than 3 bricks tested. The cement clay "may contain a suitable % of fine grog but must be machine ground and of the same degree of refractoriness as the bricks, etc., with which it is to be used."

H. K. CUMMINGS.

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Red Chrome Glazes. A. BERGE. Royal Ceramic School, Bunzlau. *Sprechsaal*, 44, 581–4.—Chrome-red can be obtained only in basic glazes or fluxes. B_2O_3 does not appear to act as an acid. The flux should be as strongly basic as possible, preferably by the use of PbO. The burn should be as short and the cooling as rapid as possible. As soon as the glaze becomes acid, the green color appears. A brick-red color was obtained from PbO, 0.15 Al_2O_3, 0.05 Cr_2O_3, 0.6 SiO_2. A dark yellowish red resulted from 0.85 PbO, 0.10 K_2O, 0.05 CaO, 0.10 Al_2O_3, 0.05 Cr_2O_3, 0.6 SiO_2; a cryst. brick-red mat glaze was: 0.7 PbO, 0.3 Na_2O, 0.20 Al_2O_3, 0.05 Cr_2O_3, 0.6 SiO_2. The batch mixt. of the last comp. was Pb_3O_4 156 parts, cryolite 42, $Cr_2(OH)_6$ 10, kaolin 26, flint 24. A brilliant red of great beauty was obtained from: PbO, 0.10 Al_2O_3, 0.05 Cr_2O_3, 0.6 SiO_2, composed of Pb_3O_4 223 parts, $Cr_2(OH)_6$ 10, kaolin 26, flint 24.

A. V. BLEININGER.

Color Experiments with Porcelain Bodies Used for Teeth. H. EISENLOHR. Royal Porcelain Manufactory. *Sprechsaal*, 44, 609–11.—The bodies were composed of 80% feldspar and 20% quartz, and matured at cone 9. The colors were feldspar-quartz fritts carried to cone 11. Three primary color fritts were prepared, yellow, reddish brown and gray. These contained 10% raw TiO_2, 10% Ni_2O_3 and 1.7% gray stain composed of 70% spathic iron ore and 2% Co, resp. The bodies may be made opaque by the addition of 5% $Ca_3(PO_4)_2$.

A. V. BLEININGER.

20. CEMENT AND OTHER BUILDING MATERIALS.

C. N. WILEY.

Retrogression in the Tensil Strength of Cement. J. M. O'HARA. *Am. Soc. Civil Eng.*, 37, 1059–64.—The fact that there may be little increase or even falling off at 28 days as compared with 7-day tests should not condemn a cement since this is due to the quick hydration of the aluminates which attain full strength in 1 mo. At this age the silicates are hydrating slowly and are not strong enough to maintain the strain already reached by the aluminates; hence retrogression occurs. This retrogression which does not occur to so great an extent in compression specimens is simply an indication of crystn. and not of disruption. The hydration of the silicates may be accelerated by finer grinding. In the discussion O'H.'s views were contradicted as other causes enter into the retrogression.

A. J. PHILLIPS.

Cement Lining for Steel Pipes on the Catskill Aqueduct, N. Y. ANON. *Eng. News*, 66, 526–9.—Mechanical details of grouting with forms are given. Use of the cement gun was discontinued on account of high cost. The high pressure causes some sand to rebound from the surface to which it is being applied necessitating an excess of sand in the dry mix. The mortar is drier than a grout and the lining must be kept moist to prevent shrinkage cracks.

A. J. PHILLIPS.

Danger in Using Rusty Steel in Reinforced Concrete. M. BELLINGER. *Eng. News*, 66, 514–5.—Steel expands $4^1/_2$ times in rusting and owing to the porosity of concrete this may cause disintegation. An editorial note states that disintegration may only occur through the action of elec. currents on the reinforcement or by presence of S compds. in the cement thus neutralizing the chem. protective influence of concrete over steel.

A. J. PHILLIPS.

Mine Tailings the Basis for a Growing Industry. OTTO RUHL. *Mining Eng. World*, 35, 733–5.

J. J. M.

Determining Penetration of Salts in Treated Wood. E. BATEMAN. U. S. Forest Service, *Circ.* 190; *Eng. News*, 66, 704; *Eng. Mining J.*, 92, 1218.—To

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test for the penetration of $ZnCl_2$ the freshly cut surface is dipped for an instant in a 1% soln. of $K_4Fe(CN)_6$. The excess of the soln. is removed by blotting paper. The moistened block is then dipped into a 1% soln. of U acetate and allowed to dry. After drying the untreated portions will have a dark red or maroon color, while the treated portions will be slightly whiter than the natural wood. For other salts, as $HgCl_2$, $CuSO_4$, etc., the same general method may be applied, but it is only necessary to dip the section under exam. in a soln. of $K_4Fe(CN)_6$. Amts. of $ZnCl_2$ as small as 0.2 lb. per cu. ft. can be detd. ROBERT KANN.

Consumption of Wood Preservatives and Quantity of Wood Treated in the United States in 1910. H. S. SACKETT. U. S. Dept. Agr., Forest Service, *Circ.* 186.—The most used preservatives are creosote, $ZnCl_2$, $HgCl_2$ and crude oil. Of the 63,266,271 gallons of creosote used in 1910, about 71% was imported, and about $^3/_4$ of that came from England and Germany. The domestic creosote was obtained from the larger cities. All the 16,802,532 lbs. of $ZnCl_2$ used in 1910 was of domestic origin. A total of 100,079,444 cu. ft. of material was treated, about 65% of it with creosote, 28% with $ZnCl_2$, and 7% with Zn creosote. WM. P. GARRETY.

Methods for the Examination of Bituminous Road Materials. P. HUBBARD AND C. S. REEVE. U. S. Dept. Agr., Office of Public Roads., *Bull.* 38.—The methods, which are given in detail, may be made the basis of standardized methods, of which there is great need. WM. P. GARRETY.

U. S., 1,012,016, Dec. 19. A. RIESCH. **Marbelizing artificial stone.**

U. S., 1,012,207, Dec. 19. A. KOLOSSVARY, S. HALTENBERGER and E. BERDENICH. **Impregnating wooden poles.**

U. S., 1,012,283, Dec. 19. K. K. SCHMIDT, H. WISLICENUS and M. KLEINSTUCK. **Coloring wood.**

U. S., 1,012,467, Dec. 19. A. C. SPENCER. **Producing cement and recovering zinc.**

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21. FUELS, GAS AND COKE.

J. D. PENNOCK.

Fuel Economy in Factories. C. E. LUCKE. *J. Ind. Eng. Chem.*, 4, 58–62.—Address. E. J. C.

Solid Fuel in 1910. II. BERTELSMANN AND HÖRMANN. *Chem. Ztg.*, 35, 1046–7; cf. *C. A.*, 5, 3726. J. J. M.

The Utilization of Peat in America. ANON. *Chem. Ind.*, 34, 661.—The resources as well as the utilization of peat is discussed. C. A. COLE.

Relation of Chemical Composition to Calorific Power in Wood, Peat and Similar Substances. H. C. SHERMAN AND C. G. AMEND. *School Mines Quart.*, 33, 30–3.—Too much reliance should not be placed upon estimates of calorific power from ultimate chem. comp. in fuels high in O. Dulang's formula, or any similar formula based on "Welter's Rule" of calculating the O with the H, is likely to give results much below the truth. The higher results obtained by calculating the O of the sample as combining with the C, according to the suggestion of Walker, are much more correct, and in most cases show a fair approximation to the values directly detd.

C. A. COLE.

Chemical Study of Lignite. II. Volatil Constituents. G. B. FRANKFORTER AND A. P. PETERSON. *J. Am. Chem. Soc.*, 33, 1954–63.—The comp. of various lig-

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nites depends somewhat upon the locality. Southern samples contain more H_2O than those from farther north. The total amt. of volatil constituents increases slightly toward the north and the individual gases vary, but not regularly. CO is practically constant and CH_4 nearly so, while the H increases as one goes north. On the whole there is little change in the volatil constituents from diff. samples although the general physical appearance is distinct in many. C. A. COLE.

The Fusing Temperature of Coal Ash. E. G. BAILEY. *Power*, 34, 802; *New Eng. Eng.*, 4, 7–15.—A very complete account of boiler tests on various kinds of coal tending to show that clinker trouble is experienced when an ash of low fusing point is used. The amt. of clinker from any one coal is affected by conditions of draft, rate of combustion and thickness of the fuel bed. Treatment of the ash with Al_2O_3 or clay may reduce clinker trouble. W. L. V. K.

The Testing of Transvaal Coals. M. THORNTON MURRAY. *J. Chem. Met. Soc. S. Africa*, 12, 131.—Discussion: JAS. GRAY remarked on the importance of correction for radiation in calorimetric tests. The correction recommended by Mahler was based on Newton's law, while that of Regnault and Pfaundler is very elaborate. A comparison of these formulas might be useful. J. Z. BRAIDWOOD said that grinding to 60 mesh was preferable to 90 mesh. Some of the disadvantages of 90 mesh on the score of accuracy are enumerated. The formulas used should be as simple as possible. Bomb calorimeters are best. Mr. Murray in reply said that the errors due to sampling should not be laid upon the analyst. In sampling coal in pieces of an av. diam. of say 1.5 in., according to the laws of error and of probability the limit of accuracy is in the region of 2% or perhaps more, and it is useless to try to reduce subsequent errors below this amt. Drying at 95–105° is the best for technical work. Dr. Moir's formula for estg. heat of combustion from ash and moisture is untrustworthy. The comment regarding Fe and S and formation of $FeSiO_3$ leaves out of account the heat of formation of $FeSiO_3$. In technical practice, when a number of samples have to be tested, it is impossible to take the time for the bomb and water to attain thermal equil. between tests. Subtraction of a const. figure for HNO_3 and H_2SO_4 appears inadvizable. As to formulas for radiation the Regnault-Pfaundler gives a correction figure $^1/_2$ or less that by the Gray-Robertson and should be discarded. E. WALLER.

Control of Boiler Furnaces. H. WINKLEMANN. *Papier Fabr.*, 9, 1527–8.—For the best utilization of fuel constant control of boiler furnaces is necessary. The best indicator of the efficiency of combustion is the automatic CO_2 recorder. When the % of CO_2 in waste gases reaches 14–15%, the efficiency is at its max. Every boiler should be provided with a thermometer for continually measuring the temp. of the waste gases directly after leaving the boiler. This should not exceed 200–300°. The stoking should be so regulated as to generate the max. amt. of steam with a minimum of draft. For small works where analysis of the waste gases may be too troublesome, boilers should be provided with an app. indicating the diff. of draft in the fire box and in the main flue. The following table explains itself. If the CO_2 recorder indicates % CO_2

2	3	4	5	6	7	8	9	10	11	12	13	14	15

then through the smoke stack goes

9.5	6.3	4.7	3.8	3.2	2.7	2.4	2.1	1.9	1.7	1.6	1.5	1.4	1.3

times as much air as is theoretically necessary for complete comb. If in practice 1.3 times excess of air requires 10.4 cu. m. air per kg. coal, then the vol. of unnecessary excess of air going out for a temp. diff. of 250° is (in cu. m.)

65.6	40.0	27.2	20.0	15.2	11.2	8.8	6.4	4.8	3.2	2.4	1.6	0.8	0.0

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and the abs. % loss of coal, at a temp. of 270° of the waste gases is

90	60	45	36	30	26	23	20	18	16	15	14	13	12

G. N. TERZIEV.

A Plea for Revision of the Rules of the American Chemical Society Governing the Proximate Analysis of Coal. M. R. CAMPBELL. *Chem. Eng.*, 14, 483–5.—A comparison of proximate analyses of coals made by the W. Va. G. S. and several stations of the U. S. G. S. show very discordant results. These discrepancies are judged to be due to differences in lab. equipment and methods of work which are so slight that they do not conflict with the regulations. Comparative results on numerous samples of coal done in the diff. labs. are tabulated and the diffs. discussed. A set of rules and regulations should be framed by the Am. Chem. Soc., that would prevent such discrepancies in results in analyses done by different labs. E. C. SCOTT.

Hyperbolas of Smoke Constituents. W. HASSENSTEIN. *Chem. Ztg.*, 35, 1250.—A discussion of formula for smoke constituents (cf. *C. A.*, 6, 146) derived by E. László. The workability of László's formulas is disputed on several grounds: The elementary comp. and the ratio of H to C in any type of fuel is far from constant; the combustion in most cases is never complete; the automatic CO_2 recorder gives at best only approx. results. G. N. TERZIEV.

Directions for the Recovery, Concentration and Testing of Ammonia. J. A. BROWN. *Chem. Eng.*, 14, 456.—B. describes in detail the operation of recovery of NH_3 at gas plants. The points emphasized are the maintenance of proper temps. and conditions in condensers and scrubbers. After leaving scrubbers, gas should be tested to insure against losses by leaks or evapn. The strength of the crude liquid and the rate of feed to the still should be constant. Constant temps. in the recovery system should be maintained and suitable tests should be made and recorded. Description of 2 alternate methods of testing NH_3 are given with illustrations of the app. required. E. C. SCOTT.

Determination of Volatil Matter in Coal. S. W. PARR. *J. Ind. Eng. Chem.*, 3, 900–2.—Variations in the volatil matter in coal as affected by diff. temp. and mechanical losses due to method of applying heat. C. A. COLE.

Progress in Gas Power in 1911. ROBERT H. FERNALD. *Eng. News*, 67, 24–5; *Chem. Eng.*, 15, 15–8. E. J. C.

Gas-forming Combustibles in 1910. BERTELSMANN AND HÖRMANN. *Chem. Ztg.*, 35, 1245–6, 1254–5, 1262–4. J. J. M.

Review in the Field of Illumination by the Use of Spirits. O. MOHR. *Z. angew. Chem.*, 24, 2385–91. E. J. C.

Comparative Costs and Efficiency of Gas, Electric and Gasoline Lighting. W. M. BLINKS. *Progressive Age*, 29, 1048–52. C. A. COLE.

Kupper's System Gas Producer. F. BAURIEDEL. *Chem. Ztg.*, 35, 1283–4.—This producer is of the rotary grate type. The CO_2 generated in the layer next to the grate is reduced to CO as it rizes through the upper incandescent layer of fuel. The most favorable temp. for complete reduction is about 1200°; below 1000° reduction is incomplete and above 1400° slagging and clinkering of the ashes results. The temp. is best regulated by the introduction of enough steam to keep the temp. at about 1200°. The claims made for this producer are that it meets fully the requirements for efficient gasifying of coke, namely: The requisit high temp. in the lowest layer of fuel for quick and complete reduction of CO_2 to CO; prevention of stoppages and clinkering with the introduction of the minimum amt. of steam; uniform distribution of the gasifying

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process throughout the entire cross-section of the generator. The last feature is attained in part by making the lower part of the shaft rotary. The quality of gas obtained is excellent, and in connection with the manuf. of steel it is claimed to have reduced the consumption of coal by 3% per ton of Martin steel. G. N. TERZIEV.

An Experiment with Vertical Retorts for Coal Gas Manufacture. J. S. DEHARD. *Chem. Eng.*, **14**, 524.—The author describes the vertical retort installation at Aurora, Ill., and gives the following results of tests on Youghiogheny coal: Coal used, 20,151 lbs; coke made, 14,841 lbs; gas made, 108,637 cu. ft.; generator fuel, 3,598 lbs.; yield gas per lb. coal, 5.39; coke yield % coal, 73.6; generator fuel per lbs. coal, 17.89; generator fuel % coke made, 24.30; c. p. on Sugg Argand D, 14.47; B. t. u. gross, 609; candle ft. 77.91. Expts. indicated a yield of 7 lbs. of NH_3 and 14.5 gals. of tar per ton of coal carbonized. E. C. SCOTT.

Recent Small Gas Lighting Units. F. H. GILPIN. *Trans. Illum. Eng. Soc.*, **6**, 604.—A comparison of small and large gas units of the inverted and upright type is made. The vol. and temp. of the free gas flame of both types and their relation to the temp. and wt. of the mantles are also discussed. In oil tests the 25 c. p. gas unit gives a higher efficiency than the unit now rated at 50 c. p. C. H. ELDRIDGE.

Helium Tubes as Light Standards. P. G. NUTTING. *J. Wash. Acad. Sci.*, **1**, 221–3; *Elec. Rev. West. Elec.*, **59**, 1074; cf. *C. A.*, **2**, 2895; **5**, 2362.—Of available gases and vapors, He is the only one emitting light of a suitable color and having reasonable lasting qualities. The light is of a yellowish white, approx. that of the Hefner flame and of an old-type carbon-filament glow lamp. He shows no trace of any secondary spectrum in the visible region. Useful life 5–100 hrs. depending on its construction and operation. The form of tube found most suitable has a capillary portion of 2 mm. bore, 2 mm. thickness of wall and is about 7 cm. long. The terminal bulbs are 35 mm. in diam. and spherical, while the electrodes are Al disks 1 mm. thick and 25 mm. in diam. The pressure used is from 4 to 7 mm. 25 milliamp. is the most suitable stand. current. Neither the voltage nor frequency of the exciting current affect the light emission by a measurable amt. The correction to be applied to the light emitted by 1 cm. length of capillary when its bore is not exactly 2 mm. was found to be —0.010 c. p. per cm. for each +0.1 mm. difference in bore from 2.00 mm. Satisfactory tests of reproducibility were made on a set of 40 tubes. Color reproducibility is within the errors of observation. G. F. YESSLER.

Operating on Coke-oven Gas versus Steam Turbins. C. A. TUPPER. *Mining Eng. World*, **35**, 1255–60.—An account of the operation of Koppers' coke ovens in connection with 2 elec. generating stations, 1 equipped with gas engins operated on waste heat from the by-product coke ovens, and the other with steam turbins. C. A. COLE.

Coal Carbonization. V. B. LEWES. *Progressive Age*, **29**, 1030–5.—Coal is a conglomerate of humus and its degradation products with the resin and their derivs. C. A. COLE.

Treatment of Coking Coal in Relation to the Quality and Appearance of the Coke. A. THAUR. *Iron and Coal Trade Rev.*, **83**, 436 (9 illus.).—The slightly dark gray appearance of a certain piece of coke is attributed to too low oven temp. (1000°, 41 hrs. time). C. A. COLE.

By-products of the Coke Manufacture in the United States. ANON. *Chem. Ind.*, **34**, 718.—Statistical. Comparison of the various types of ovens giving the quantity and value of the recovered by-products, is also given. C. A. COLE.

Use of Moist Bagasse (MURGEON). **28.** Sewage of Ammonia Works. **14.**

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U. S., 1,011,530, Dec. 12. L. H. UPTON. **Gas-making apparatus.**

U. S., 1,011,578, Dec. 12. W. B. CHAPMAN. **Gas producer.**

U. S., 1,011,932, Dec. 19. W. FEICKS. **Coke oven.**

U. S., 1,011,933, Dec. 19. *Idem.* **Coke oven or gas furnace.**

U. S., 1,012,120, Dec. 19. C. BARMORE, JR. **Operating gas producers.**

U. S., 1,012,488, Dec. 19. U. WEDGE. **Furnace-gas-purifying apparatus.**

U. S., 1,012,676, Dec. 26. C. T. MALCOLMSON. **Briquet of anthracite coal particles.**

U. S., 1,012,684, Dec. 26. W. B. MCLAUGHLIN. **Destructive distillation of wood or coal.**

U. S., 1,013,013, Dec. 26. H. A. GRINE. **Apparatus for making producer gas from liquid hydrocarbons.**

U. S., 1,013,050, Dec. 26. F. J. ORR, Buffalo, N. Y. **Apparatus for generating and burning oil gas.**

22. PETROLEUM, ASPHALT, COAL TAR AND WOOD PRODUCTS.

R. E. HUMPHREYS.

Fallacies in the Organic Origin Theory of Petroleums. I. EUGENE COSTE. *Mining Sci.*, 64, 493–4; *Eng. Mining J.*, 92, 1192; cf. *C. A.*, 5, 57.—Two simple, patent geological facts are sufficient to disprove and condemn all the theories of the organic origin or petroleums. (1) The remains of the soft organic tissues of animals were never intombed in the sedimentary rocks and (2) the vegetable organic remains were always transformed into coals. The production of CH_4 from decomposing vegetation occurs in the process of the transformation of such material into peat, carbonaceous matter and coal rather than into petroleums. There is everywhere a lack of connection between coal beds and petroleum deposits. The analogy between the CH_4 of the coals and of the petroleums is only one of chem. comp., indicating simply that CH_4 can be formed in 2 or more different ways. The rapid and complete disappearance of all dead animal tissues is well known, while the formation of strata is such a slow process that even the hard parts of animal organisms are often much destroyed before their final entombment. The fossiliferous beds of all ages are entirely barren of petroleum. The abundant production of hydrocarbon gases in volcanic phenomena cannot be disputed. These phenomena manifested along great tectonic disturbances of the earth's crust leads to the belief that fissures caused by dynamic disturbances of the crust permit escape of vapors and gases, which are trapped in porous portions of the sedimentary strata to form oil and gas deposits. Oil pools are always found grouped along fissured zones of disturbances, and never extend far from the fractures which formed the channels of hydrocarbon emanations from the interior. The same quality of oil may be found in all kinds of strata, as along the Appalachian belt. As much as 0.2% C has been shown to exist in massive cryst. rocks, which is 20 times as much C as may be found in the atm.; showing that the source of C is far from residing in the organic kingdom. R. E. HUMPHREYS.

Paraffin in Petroleum. ANON. *Oil and Colour J.*; through *Chem. Tech. Ztg.*, 29, 141.—Zaloziecki dissolves 5 g. of the oil to be tested in 5–6 pts. of amyl alc., and ppts. the paraffin wax at 0° with an equal wt. of C_2H_5OH. While this method is suitable for light oils, it cannot be used with viscous oils. Holde dets. the paraffin as follows: In a 150–200 cc. Erlenmeyer 10–20 g. of a paraffin-poor oil, solidifying below 5°,

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are mixed with 5 g. of the oil rich in paraffin, and the mixt. dissolved in a soln. of 1 pt. of 98.5% C_2H_5OH and 1 pt. of $(C_2H_5)_2O$ until a clear soln. is obtained. The soln. is then cooled to —20°, and enough of the C_2H_5OH–$(C_2H_5)_2O$ soln added, with stirring, until all the oil drops are dissolved, and no paraffin flakes or crystals are observed. The mixt. is brought upon a filter, cooled to —20°, and the paraffin remaining on the filter is washed with the C_2H_5OH–$(C_2H_5)_2O$ soln. and cooled to —20°. In the case of a hard paraffin, a mixt. of equal pts. of C_2H_5OH and $(C_2H_5)_2O$ is used as the wash, and in the case of a soft, oily wax a mixt. of 2 pts. of C_2H_5OH and 1 pt. of $(C_2H_5)_2O$ is used. The paraffin remaining upon the filter is dissolved in C_6H_6, the latter evapd., and the paraffin dried at 105° for 1/4 hr., and weighed. O. E. BRANSKY.

Sulfur in Petroleum. D. LOHMANN. Minatitlan, Mexico. *Chem. Ztg.*, **35**, 1119–20.—L. gives the following method for detg. S in oils: 1.0–1.5 g. oil is introduced into the Pt dish of a Mahler bomb by means of a Lunge-Rey pipet and ignited by an elec. spark in an atm. of O, the O pressure varying from 10 atm. for benzine to 20 atm. for crude oil and 25 atm. for asphalt and coal. The gases formed by combustion are passed through 8% Na_2CO_3 soln., the bomb washed out by water and the combined solns. evapd. to 50 cc. The ppts. Fe_2O_3 and Al_2O_3 (coming from the wire and glass of the bomb) are filtered off hot. The filtrate is made acid with 7.5 cc. conc. HCl, heated on a water bath 1 hr. and the S pptd. by 10 cc. 10% $BaCl_2$ soln. and filtered after 12 hrs. standing, washed with dil. HCl, ignited and weighed as $BaSO_4$. A negligible error is introduced by the slight solubility of $BaSO_4$ in dil. HCl (1 in 150,000). This error amounts to 0.008% if 1 g. oil be taken for analysis. On distilling an oil, a gradual conc. of the S takes place. V. NUNEZ.

Chemical Synthesis of High-boiling Mineral Oils. J. MARCUSSON. *Chem. Ztg.*, **35**, 742–4; cf. *C. A.*, **5**, 3728.—Russian oils contain a higher % of stable, satd. hydrocarbons which react with fuming HNO_3 than American oils. Both oils form with HNO_3 complex dinitro compds., containing about 7% N. The optically active constituents of petroleum consist, apparently, of naphthenes or polynaphthenes, which is in accordance with the cholesterol theory. V. NUNEZ.

23. CELLULOSE AND PAPER.

A. D. LITTLE.

Cellulose: Hydrocellulose. C. G. SCHWALBE. Darmstadt. *Z. angew. Chem.*, **24**, 1260–2.—Polemical against Jentgen (*C. A.*, **5**, 1187, 1677, 3153). E. J. WITZEMANN.

Paper and Hygiene. S. FERENCZI. *Z. angew. Chem.*, **24**, 2240–3.—A number of novel and noteworthy used of paper are mentioned. V. NUNEZ.

Caustic Recovery in Soda Cellulose Mills. ANON. *Papier Ztg.*, **36**, 3489–90.—The Rinman process, in use at Skutskär, Sweden, calls for the recovery of soda by pptg. the organic matter from the waste liquor by means of CO_2 in the presence of NaCl. The pptd. material is distilled to form acetone, MeOH, etc. V. NUNEZ.

Researches on Rosin. C. G. SCHWALBE AND E. KÜDERLING. *Wochbl. Papierfabr.*, **42**, 4303–7; cf. *C. A.*, **6**, 430.—The m. p. lies between 65.6° and 76° and no idea of the value of the rosin can be gained by this detn. Solubility in petroleum ether is a valuable guide, however, since rosins largely insol. in this menstruum are unfit for paper sizing, as they give the paper a yellow color. The insol. portion is increased by atmospheric oxidation and by warming. The turpentine oil content

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of the rosin has no harmful effect on the size. In rosin and rosin-size analysis the authors advocate using a temp. of 100° instead of 105° when drying to const. wt.

V. NUNEZ.

24. EXPLOSIVES.

C. E. MUNROE.

Accidents in the Transport and Use of Explosives. CHARLES S. HURTER. *Mining Eng. World*, 35, 627–9. J. J. M.

Initial Detonation. L. WÖHLER. *Z. angew. Chem.*, 24, 2411; see *C. A.*, 5, 3730. C. G. STORM.

Methods of Ignition of Explosives. TAFFANEL AND DAUTRICHE. *Compt. rend.*, 153, 823–5.—Expts. were made regarding the efficiency of different methods of priming a charge of explosive, the detonator being placed at the front end, rear end, or in the center of the charge. 3 powders with base of NH_4NO_3 were used, "grisoutine-roche," (30% nitroglycerin), "grisoulite-roche," (8.5% dinitronaphthalene), "grisoulite-couche," (5% trinitronaphthalene and 5% KNO_3), and also carbite d'Ablon, (similar to German carbonite). It was found that when the detonator was placed in the front end of a cartridge, the explosion was communicated to a second cartridge placed in line behind it at a greater distance than when the detonator was in the rear end of the first cartridge. The velocity of the wave of detonation in each direction in a cartridge of carbite fired by means of a detonator at its central point, was detd. by means of a detonating fuse (*Ibid.*, 144, 1030). The velocity of the wave was greatest at the end toward which the cap pointed. C. G. STORM.

Report of Chief Inspector of Explosives for Victoria on the Working of the Explosives Act in 1910. R. J. LEWIS. *Z. ges. Schiess-Sprengstoffw.*, 6, 390.—L. gives a brief discussion of the factors involved in the formation of injurious gases in blasting work: (1) comp. of explosive, (2) nature of material to be blasted, (3) method of charging and tamping. Expts. with so-called "fume destroyers" indicate that the O set free by such materials tends to prevent the formation of CO. A table gives the amts. of various explosives imported in 1910. A summary of analyses made is also given. C. G. STORM.

Report on Investigations into the Composition of Gases Caused by Blasting in Mines. E. A. MANN. Chief Inspector of Explosives in Western Australia. *J. Soc. Chem. Ind.*, 30, 1281; cf. *C. A.*, 5, 2179.—Some of the figures given for the N content of collodion cotton in the original report have been found to be incorrect, and the amended results show that in 7 collodion cottons examined, the N content varied from 11.27 to 12.16%. This correction necessitates alterations in the calcs. for O balance in the various explosives. In 20 samples of various brands of gelignite, gelatin dynamite and blasting gelatin, 3 were found to be theoretically under-oxidized, the greatest deficiency being 1.47% of O. In those which were theoretically over-oxidized, the highest excess of O was 6.13%. When the paper wrappers were taken into account in the calcs., 11 of the explosives were found to be under-oxidized, the greatest deficiency being 3.63%. Detns. of the velocity of detonation were made, the lowest figure obtained being 1708 meters per sec. for one of the gelignites and 4100 meters per sec. for one of the blasting gelatins. The view is advanced that in gelatinized nitroglycerin explosives containing collodion cotton, sensitiveness to detonation is due to free nitroglycerin distributed throughout the mass of the explosive, in intimate contact with the main mass of colloidal mixture of collodion cotton and nitroglycerin. It is considered possible that this nitroglycerin is very slowly absorbed into the mass of the colloid, and

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there exerts its power of soln. upon particles of collodion cotton not completely dissolved, and that when this absorption takes place the explosive becomes less plastic and less sensitive. The general experience in Western Australia is that an explosive, which, on landing from Europe, is soft and plastic, will, after a lengthy storage in the magazine, become stiff and more rigid to touch, while the common experience is that such explosives explode only under excessive stimulus, and are very apt to leave unexploded portions in the bottoms of the bore-holes in mines. These facts, in the author's opinion would indicate that an explosive which, brought direct from the factory, contains a certain proportion of free nitroglycerin and is therefore quick and sensitive, becomes inert on storage. When an increase in inertness takes place it is further often accompanied by fall of heat test and it is suggested as an explanation of this that an extended soln. of collodion cotton due to the further absorption of nitroglycerin liberates small quantities of acids from the fibers of the collodion cotton which have not been extracted by washing in the factory. The heat tests immediately after manufacture are higher than those obtained when the explosive is landed in Australia, and although the voyage through the tropics has been advanced as a possible explanation of this, no physical change has been given as a possible key to the series of phenomena observed.

CHARLES E. MUNROE.

An Explosion of "Detonating Corks." ANON. *Z. ges. Schiess-Sprengstoffw.*, **6**, 398.—A portion of a carton containing 1000 "detonating corks" mailed from Sweden as merchandise, exploded in the Berlin post office, causing considerable damage. These explosives are used in "bicycle pistols." C. G. STORM.

U. S., 1,011,238, Dec. 12. G. M. PETERS and M. F. LINDSLEY. **Explosive.**

U. S., 1,011,511, Dec. 12. E. SOKOLOWSKI and G. ISSLER. **Funnel for loading fused explosive charges.**

U. S., 1,011,699, Dec. 12. S. W. YOUNG. **Cartridge for destroying fumes of dynamite, etc.**

U. S., 1,012,146, Dec. 19. R. E. NOBLE. **Electric system for discharging explosives.**

U. S., 1,012,368, Dec. 19. G. G. KING and M. F. LINDSLEY. **Explosive.**

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25. DYES AND TEXTIL CHEMISTRY.

L. A. OLNEY.

Heinrich von Brunck. P. JULIUS. *Z. angew. Chem.*, **34**, 2417–20. A. BERNTHSEN. *Chem. Ztg.*, **35**, 1385–6.—Obituary. E. J. C.

A Review of the Chemistry of Dyes of 1908-10. E. GRANDMOUGIN. *Chem. Ztg.*, **35**, 1126–8, 1158–60, 1175–7, 1210–1, 1230–2, 1246–8, 1264–5, 1274–6. E. J. C.

Berlin Blue and Turnbull's Blue. E. MÜLLER. *J. prakt. Chem.*, **84**, 353–69.—Berlin blue and Turnbull's blue are both ferrocyanides but are not identical. By action of $K_4Fe(CN)_6$ on $FeCl_3$ in aq. soln. $Fe_4'''[Fe''(CN)_6]_3$ is only formed when 1.33 or more moles of $FeCl_3$ act on 1 mol. of $K_4Fe''(CN)_6$. Any other proportions give mixts. of the above compd. with $KFe'''Fe''(CN)_6$. By action of $K_3Fe(CN)_6$ on $FeCl_2$, $KFe_2''Fe_3'''[Fe''(CN)_6]_3$ is formed when 1.4 or more moles of $FeCl_2$ act on 1 mol. of $K_3Fe'''(CN)_6$. $KFe''Fe_3'''[Fe''(CN)_6]_3$ is formed when the mol. relation is 1 : 1.33.

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Other proportions give mixts. of the last 2 compds. together with $KFe''Fe_2'''[Fe''(CN)_6]_3$, $KFe'''Fe''(CN)_6$ and $Fe_4'''[Fe''(CN)_6]_3$. SIDNEY BORN.

Bisulfite Compounds of Hydroxyazo Dyes (VOROZHTZOV). 10. Dry Dyeing of Leather and Furs. 29. Dyeing Leather (BRITTON). 29. Substantive Color Phenomena (SHAPOSHNIKOV). 2.

U. S., 1,012,389, Dec. 19. H. MARCHE. Making velvet, plush, carpets, imitation fur, etc.

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26. PIGMENTS, RESINS, VARNISHES AND INDIA RUBBER.

A. H. SABIN, DAVID SPENCE.

Further Contribution to the Knowledge of Bee Resin (Propolis). K. DIETERICH. *Pharm. Zentralhalle*, 52, 1019–27; cf *C. A.*, 5, 793.—The free wax as well as the wax containing resins was examd. The wax was sepd. with petroleum ether and the residue, insol. in the solvent, treated with abs. alc.; a soln. of crude resin is thus obtained. The resin m. 90–106°. With H_2SO_4 a blue-green soln. is obtained; KOH changes this to a yellow-green, fluorescent one. From the crude resin 4 resins were isolated. By sapon. a resin alc., *proporesinotannol*, was obtained and a propolis resin acid also. The results of the investigation are: Wax up to 60%, insol. matter 22%, volatil at 100° up to 6%, propolis balsam (after Bohrish) up to 11%, vanillin in balsam traces, gums small quant. Propolis crude resin m. 90–106° and contains: tannins about 20%, (*proporesene*), insol. in cold abs. alc. and m. 76–83°, 1.5%, *α-proporesin* (insol. in Et_2O, m. 182–7), 1%, *β-proporesin* (insol. $CHCl_3$, m. 124–5°), 4%; free resin acids, traces. Pure resin about 70%, gives a resinotannol ester, m. 70–73°. Oxidation products of tannins such as phlobophene, etc., 3.5%. Propolis is classed with the resinotannols of Tschirch. A. VORISEK.

A New Paint-destroying Fungus. MASSEE. *Bull. Misc. Information Roy. Bot. Gardens, Kew, England*, 8, 25.—A new species (*Phoma pigmentivora*) was found to flourish upon the white paint in very humid greenhouses. It ruins the painted structures by producing large blood-red blotches upon them. Spores sown in pure-culture upon white-lead-linseed-oil paint soon developed its characteristic red pigment but when sown upon either of the ingredients alone no growth was made. White paint made up with 2% phenol was not attacked by the fungus. It is suggested that the red pigment may be red lead resulting from the oxidation of white lead. The pigment was completely bleached by H_2O_2. E. D. CLARK.

Reply to the Communication of W. P. Dreaper: A Comparison of the Dyeing, Tanning and Vulcanization Processes. W. FAHRION. *Z. chem. Ind. Kolloide*, 9, 243.—F. points out in reply to Dreaper (*C. A.*, 5, 3631) that in processes of dyeing and tanning, substances do not come into immediate contact so that full conditions for a chem. reaction are not attained and stoichiometric relations between reactive substances need not, therefore, be expected. It is incorrect to assume, because the taking up of the dye or the tannin by the fiber does not follow a stoichiometric law, that dyeing or tanning are not chem. processes. F. holds that chem. processes set in when physio-chem. are ended and that the physio-chem. reaction by bringing the substances into closer contact, is the first step towards chem. union of substances.

D. SPENCE.

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Composition of Para Rubber Seed Oil. SAMUEL S. PICKLES AND WILLIAM P. HAYWORTH. *The Analyst*, 36, 491–2.—The kernels of the Para rubber seed (*Hevea brasiliensis*) contain about 49% of a drying oil having the following constants: d_{16}^{15} 0.9239, acid value 29.9, sapon. no. 185.6, I no. 133.3, titer 33°, Hehner value 96.4, R.-M. no. 0.5. The mixed fatty acids contain 14% satd. (solid) consisting of stearic and a mixt. with m. p. 56.5° and 86% unsatd. (liquid) which are 32.6% oleic, 50.9% linoleic and 2.5% linolenic. The oil may become a substitute for linseed oil. H. S. BAILEY.

Guayule (LLOYD). 11D. Researches on Rosin (SCHWALBE, KÜDERLING). 23.

U. S., 1,011,611, Dec. 12. E. C. GATLIN. **Paint-oil mixture.**

U. S., 1,011,659, Dec. 12. E. H. STRANGE. **Making varnish.**

U. S., 1,011,759, Dec. 12. L. C. A. DE CLERCQ. **Regenerating vulcanized rubber waste.**

U. S., 1,012,030, Dec. 19. W. H. UNDERWOOD. **Plastic materials for tire-tread, etc.**

U. S., 1,012,177, Dec. 19. H. TERRISSE. **Paint for hulls of ships, etc.**

U. S., 1,012,887, Dec. 26. S. MEDVECZKY. **Making a material for casting and painting.**

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27. FATS, FATTY OILS AND SOAPS.

E. SCHERUBEL.

The Chemist and the Cottonseed Oil Industry in America. DAVID WESSON. *J. Ind. Eng. Chem.*, 4, 64–5.—Address. E. J. C.

New Calculation Method Based on the Relation between Neutral Fat, Glycero and Fatty Acids. S. ZIPSER. *Chem. Ztg.*, 35, 1238–40.—Let s = acid no. found, v = sapon. no., d = ester no. (v-s); S = acid no. of 100% fatty acids, V = sapon. no. of 100% neutral fat, F = % total fatty acids, f = % free fatty acids, N = % neutral fat, G = % glycerol and A = % total yield of fatty acid and glycerol. In the case of neutral tallow v = 195, S = 0, d = 195. Then F = 0.100–0.02258 × d = 95.6%, S = 100v/F = 204, G = 0.05466 × d = 10.66%, A = F + G = 106.26%. In the case of partly decomposed tallow let v = 196.4, s = 32.6, d = 163.8. Then F = 100–0.02258 × d = 96.3%, S = 100V/F = 204, G = 0.05466. d = 8.95%, f = 100s/S = 16.0%, N = 100 — f = 84.0%, V = 100d/N = 195. In the case of tallow fatty acids the value of V may be found as follows: V = 204, s = 204 = S, d = 0, F = 100–0.02258 d; in the case of neutral fat d = V = v, hence F = 100–0.02258 V. F = 100v/S = 100V/S, 100V/S = 100 = 0.02258 V. V = S/(1 + 0.0002258 S) = 195. The formula given here can only be used when impurities are absent. If they are present they must be given consideration in the formula. Examples of calc. are given in detail where such is the case. E. SCHERUBEL.

Determination of the Reichert-Meissl Number. M. SIEGFELD. Hameln. *Chem. Ztg.*, 35, 1292.—The Reichert-Meissl no. was detd. on 8 samples of butter of widely varying volatil fatty acid content, using both the Leffmann and Beam method and the Kreiss modification (*C. A.*, 6, 164) of the same. The latter checks closely with the former and requires less time and smaller flame in sapon. The use of KOH and

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the small amt. of glycerol required are also advantageous, especially since glycerol contains an appreciable amt. of volatil acid and is rather expensive.

E. L. P. TREUTHARDT.

Composition of the Fat from the Seeds of Lophira alata, Banks. SAMUEL S. PICKLES AND WILLIAM P. HAYWOOD. *Analyst*, 36, 493–4.—This fat, known as "Niam" fat, "Meni" oil or "Zawa" oil, composes about 42% of the seeds of *Lophira Alta*, B. It is a light yellow butter having a d_{40}^{40} of 0.0916–44, acid no. 25.9–48.0, sapon. no. 180.7–194.6, I no. 69.8–72.5, R.-M. no. 0.8–0.9, and titer of 47–49°. The fatty acids are about 50° satd. (solid) and 50° unsatd. (liquid), the former being a mixt. of arachidic, palmitic and probably a lower m. p. acid, and the latter nearly equal parts of oleic and linoleic acids. The oil is used by the West Africans for food and as a hair dressing.

H. S. BAILEY.

Knowledge of Bee Resin (DIETERICH). 26.

U. S., 1,012,572, Dec. 19. W. S. SIMPSON. **Extracting oils and fats from vegetable or animal substances.**

U. S., 1,012,830, Dec. 26. K. ENGEL. **Tallow substitute for lubricating purposes.**

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28. SUGAR, STARCH AND GUMS.

A. HUGH BRYAN.

The Decomposition of Dextrose by Dilute Sulfuric Acid. H. OST AND TH. BRODKORB. *Chem. Ztg.*, 35, 1125–6.—A detailed account of previous work (*C. A.*, 4, 1888) is necessary because former results have been questioned by Neuman. Tables showing amt. of dextrose found in solns. of known strength, both by polarization and Cu reduction, after heating with varying amts. of H_2SO_4 at 100°, 120° and 145° for 2–24 hrs. are given. The % found by polarization is always a little higher than by Cu reduction, due to a partial conversion of dextrose into isomaltose. The longer the heating and the higher the temp. the less dextrose remains unchanged, only about 25% being left after heating at 145° for 7 hrs. The products of this decomp. are largely levulinic and ameisenic acid and huminic substances.

H. S. BAILEY.

The Andrlik Urea Method of Polarization for Cane Products. W. E. CROSS AND W. G. TAGGART. *Intern. Sugar J.*, 13, 662.—It is possible that at 15° or some lower temp. the use of urea or betaine may be useful in checking inversion, but at 20° and especially at 28°, which is the usual temp. in the working season in cane producing countries, neither of these substances retards inversion sufficiently to enable the single polarizations to be made successfully.

A. GIVEN.

Clarification of Saccharin Liquids in Certain Difficult Cases. E. POZZI-ESCOT. *Bull. assoc. chim. sucr. dist.*, 29, 157–8.—Sugar solns. containing much gum should be clarified as follows: First clarify as usual with Pb subacetate, then add to soln. an equal vol. of 95% alc. and filter.

WM. E. CROSS.

Clarification of Saccharin Liquids in Certain Difficult Cases. H. PELLET. *Bull. assoc. chim. sucr. dist.*, 29, 214–6.—The causes of gumminess in juices (beet and cane) are discussed. P. has used the alc. method for years and recommends it (cf. preceding abstr.).

W. E. C.

Examination of Sulfur Dioxide Used in Clarification for Sulfuric Acid. A. HERZFELD. *Z. Ver. Zuckerind.*, 61, 917–22.—As traces of Cu and Fe salts strongly accelerate formation of H_2SO_4 from SO_2 in aq. solns. the method of passing the SO_2 into

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water and examg. the soln. for SO_4'' is unreliable. On the other hand sucrose and glucose are negative catalysts in respect of this reaction, so H. recommends method of passing gas 20–30 min. into a 40–50% soln. of cane sugar, and then to test a portion of the soln. with $BaCl_2$ and HCl. In further work the possible catalytic action of traces of Fe in the juice on the SO_2 used in clarification will be investigated. W. E. C.

Sugar Estimation in the Beet by Alcohol and Water Digestion Methods. ST. LEVITCKI. *Centr. Zuckerind.*, **20**, 357.—As a result of 375 comparative detns. in 1904–10 L. finds 16.56% sugar in beet by alc. extraction, by hot water digestion 16.46%, and by hot alc. digestion 15.82%. The alc. digestion gives unreliable results.
A. H. BRYAN.

Practical Chemical Analysis for Sugar Factories. ARM. LE DOCTE. *Sucrerie belge*, **40**, 130.—A long series of tests have shown that instantaneous extraction in the cold, hot water digestion in the presence of Pb subacetate and hot water digestion with the addition of the Pb subacetate after digestion, all give the same results on fresh, sound beets, but that when the beets begin to discolor and decompose, the hot digestion with the Pb soln. in many cases gives too high a polarization, and should accordingly be checked against the other methods. A. GIVEN.

Results of Sugar House Work. K. KAISER. *Deut. Zuckerind.*, **36**, 912–3; *Centr. Zuckerind.*, **20**, 356–7.—A discussion of the method of figuring "rendement," *viz.*, $2^1/_4$ times the total non-sugar in place of 5 times the ash to be subtracted from the direct polarization. A. H. BRYAN.

A New Scale for Weighing Juices. J. A. MARONIER. *Arch. Suikerind.*, **19**, 1375–82. W. L. BADGER.

Hundred Years of the French Sugar Industry. ANON. *Centr. Zuckerind.*, **20**, 323. A. H. BRYAN.

Hydrosulfites in Sugar-making. What is the Action of Hydrosulfites on Diffusion Juices and Especially on the Pectic and Nitrogen Substances Contained in these Juices? J. WEISBERG. *Bull. assoc. chim. sucr. dist.*, **29**, 278–82.—The claim has often been made, that the use of hydrosulfites in sugar-making allows of the use of a smaller amt. of lime, hydrosulfites being supposed to remove pectinous and N substances from juice. W. points out relative high cost of hydrosulfites as substitute for lime, and believes moreover that these substances have no pptg. action on pectins and N substances. He cites work of Novakovskii and Muszynskii (*Gaz. Cakrownicza*, **33**, 17) where careful expts. are described, comparing clarification with and without hydrosulfites, both at high and low temps. Expts. show that hydrosulfites did not ppt. pectinous or N substances. Sugar house expts. in Trawniki (on a large scale) showed that the use of hydrosulfites did not allow of any diminution of the amt. of lime necessary for clarification. WM. E. CROSS.

The Use of Moist Bagasse in Cane Sugar Factories, etc. L. MURGEON. *Intern. Sugar J.*, **13**, 658.—Moist bagasse can be used with special grates and furnaces, but much heat goes to evap. the water of the bagasse itself. Where drying is not too expensive it adds greatly to the efficiency down to a moisture content of about 30%, beyond which the gain is small. Figures calc. from the theoretical calorific value agree almost exactly with those obtained in practice in Mauritius. The installation of the Huillard drying app. in a factory of 500 tons capacity per day will pay for itself in 3 campaigns by the saving in fuel. A. GIVEN.

Financial Comparison between the Preparation of Superior Sugars by the Defecation-sulfitation and the Carbonatation Processes. J. S. DE HAAN. *Arch. Suikerind.*, **19**, 1342–67.—The actual diff. between rendement by the carb. and defec. processes, for a factory which used both in successive campaigns, was 2.35% (ascribed to the use

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of the method of washing the filters described in *C. A.*, 5, 2196) in favor of the carb. Considering that this is recovered as first sugar, an itemized account of the cost for the 2 processes shows a balance of 1 ct. per pikol (1 pikol = 133 lbs.) against the carb. Carb. factories in Java in 1910 obtained an av. of 1.1% higher rendement than defec. factories working on the same product. W. L. BADGER.

Single Carbonatation in Practice. W. H. TH. HARLOFF. *Arch. Suikerind.*, 19, 1405–32; cf. *C. A.*, 5, 3636.—The Boedoeran factory operated on the single carbonatation process in the past campaign. The only difficulties met with were an occasional cloudiness of the juices, and an increase in alkalinity, both before and after filtering. The first was solved by more careful dressing of the presses; when the thick juice was cloudy, sulfuring cleared it up. The second was laid to fine particles of unslacked lime, which became coated with a layer of $CaCO_3$ during carbonatation, but were more or less broken up in the presses. In ordinary juice from second carb., where the CaO is all in soln., carbonatation, after pptg. $CaCO_3$, forms K_2CO_3 and $KHCO_3$ before neutrality is reached, and over-carbonatation forms sol. $CaH_2(CO_3)_2$. In juice from single carb. there is no free CaO in soln., and less than $^1/_2$ the usual amt. of Ca salts in soln.; hence if the juice is over-carbonated, the breaking up of the lumps of suspended free CaO will merely ppt. dissolved $CaH_2(CO_3)_2$. A very small amt. of CaO is sufficient for this. To prevent troublesome alkalinity juices, it is necessary to slake the lime quite hot and screen the milk well. Comparison of single and double carb. shows: In single carb, more careful prep. of the $Ca(OH)_2$ is necessary, especially if old or air-slacked CaO is used. Sulfuring thick juices is necessary. Unavoidable suspended free CaO prevents over-carbonation. Thin juices are generally faintly alk. to phenolph.; 60–100 mg. CaO per l. is the max. As clear thin juices may be obtained as with double carb. Factories which do not remelt after-products may dispense with thick juice filtering, if the first wash sirup is added to the raw juice. Lactic acid fermentation is more easily prevented. The juices never contain more than $^1/_2$ the Ca salts usual with double carb. Single carb. requires less original investment, and affects a saving in filter cloths, wages and steam consumption. Filtering the first green sirup through Danek filters inproves the viscosity, increases the purity of after-products, and removes large amts. of Ca and K sulfates. W. L. B.

The Dextro-polarizing Substances of the Beet. I. DOCHLENKO. *Centr. Zuckerind.*, 20, 431.—D. studied the direct and invert polarization of juices obtained from beets by cold as well as hot water digestion and with and without the use of Pb subacetate. He draws the following conclusions: (1) The hot water digestion method gives accurate figures for sugar in beet. In this, by inversion, comparable results with the direct polarization will be given if the non-sugars are pptd. by Pb. (2) The Clerget inversion method cannot be used without first removing the non-sugars with Pb. (3) The *d*-polarizing substances are pectins with varying digestibilities in the heat of extraction, but are pptd. by the Pb and decomposed by lime and, hence, do not influence the direct polarization in a hot water digestion. (4) The unusal great unestd. loss cannot be ascribed to those pectins. A. H. BRYAN.

Prospects of the Beet Industry in England. A. STEIN. *Z. Zuckerind. Böhmen.*, 36, 81–91.—Climate, soil and other conditions in England are ideal for beet, and good tonnages are assured. WM. E. CROSS.

Sugar Beets and the Influence of Manure and Lime. M. *Engrais*, 26, 1133–6. E. C. LATHROP.

The Germinative Power of Beet Seed of 1911. ANON. *Sucrerie belge*, 40, 129.—Beet seed of 1911 are developing more than 100,000 germs per kilo which will make it necessary to use only 70% of the quantity of seed used last year. A. GIVEN.

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29. LEATHER AND GLUE.

LLOYD BALDERSTON.

Scientific and General Remarks about the German Leather Industry and Tannery, Value and Objects of Leather Investigation. LUDWIG JABLONSKI. *Shoe Leather Rep.*, 103, No. 12, 37; 104, No. 4, 81.—J. treats of the investigation of leather suitable for belting stock. Analysis is necessary to det. sp. wt. of the sample, the amt. of fat liquor and tannin used, and the pressure of any other filling material. It will also show the relation of hide substance to tannin, the presence of free mineral acids and many other points not readily available to the practical man. The 3 most important points to the manufacturer are: (1) The sp. wt., which is the foundation for the calculation from the wt. to the measurement. (2) The hide substance. (3) The amt. of filling materials. Grease is often used to give a leather weight. H_2SO_4 is used in many cases to bleach the leather. If not removed it has a very injurious action causing the leather to become stiff and brittle and eventually rotten. A darker leather which has not been bleached is much better and much more serviceable than the lighter leather which has been bleached with H_2SO_4. The great difficulty in the analysis of leather lies in getting a correct sample and the results obtained are dependent upon the portion of the hide from which the samples are taken. Results for sp. wt. and hide substance on 12 sep. parts of the hide show that the different parts of the hide vary greatly in both sp. wt. and hide substance, the higher figures being obtained on portions of hide near the backbone. The curves, plotted for these results on salted steer hides, have the same general direction, indicating that the same portions of the hide have the high sp. wt. and hide substance. J. S. ROGERS.

A Short Account of the Principal Natural Laws Governing the Absorption of Tannin by Skins. M. NAWAB-UD-DIN. Amritzar. *Leather*, 3, 526–7.—The bulk of true skin is assumed to be composed of gelatinous tissue a mol. of which contains both amido groups, which link with acids, and carboxyls, which combine with alkalies. Both the acids and the alkalies which the hide fiber freely absorbs increase its power to absorb water and swell. This opens the interspace of the fiber so the tannins in colloidal soln. may penetrate. The process of tanning is slower and more tannin is absorbed when the leather is plump. Whatever their chem. constitution, all tannins are weak acids and have more or less power of diffusion through the gelatin. This is very slow compared with that of crystalloid substances, yet it is appreciable. There is a mutual affinity, then, between the gelatin of the fiber and the acid of the tannin. Tannins dissolved in water penetrate to the finest membranes and diffuse and ppt. gelatin. In the later stages the pptn. undergoes some chem. changes, probably oxidation, dehydration, etc., finally producing leather. In both mineral and oil tannages oxidation takes place. Astringency of tannins plays a fair part in the absorption question, for skins absorb astringent tannins in preference. In order to avoid incomplete tannage stronger liquors should be successively employed to penetrate through the tanned exterior of the pelt. Absorption, then, involves both chem. and physical actions, sometimes accompanied with mechanical deposit of blooms, reds, etc.

J. S. ROGERS.

Liming Hides for Sole Leather. Practical Hints on Working the Limes. B. BEEBEE. *Leather*, 3, 681.—To eliminate trouble from dust, lime should be stored by slaking a large quantity in a shallow pit and when cool adding sufficient water to make a stiff paste. After coming from the soaks the hides are set for 3 or 4 days in previously used lime liquor in order that the NH_3 and bacteria present may break down the mucous layer of the epidermis and liquefy the soft growing cells of the hair root and sheath. The pack is then set in practically steril fresh lime (8–10% on

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the green wt. is plenty) which checks the softening caused by the old lime, loosens the hair, and plumps up the whole hide. When hauled the hides should be spread out to avoid creases. Each hide should be immersed separately to avoid uneven liming. The insol. soap formed by action on the fat in the hide must be scudded out to prevent dark marks on the finished leather. J. S. ROGERS.

The Utilization of Wattle Bark. Production Rapidly Increasing in British Colonies. ANON. *Leather*, 3, 696–7.—The exports of wattle bark from Natal, Cape province, and the Australian Commonwealth have increased rapidly during the last few yrs. The analyses of wattle barks from Natal and the East African Protectorate are given showing that they are rich in tannin and have little variation in quality. Wattle-bark liquors are less prone to fermentation than other tanning liquors because they contain less sugar. Wattle bark is comparatively very cheap. The tannin is easily extracted. Wattle-bark liquor shows little loss of strength when kept. While best suited for heavy leathers it can be used for certain kinds of light leathers such as shoe uppers. J. S. ROGERS.

The Nature and Influence of Sulfited Tanning Extracts. PATHFINDER. *Leather*, 3, 616–7.—P. discusses the difference between the chem. compd. "bloom" which is the deposit in the case of catechol tannins and the "reds" of "phlobaphenes" deposited in the case of pyrogallol tannins. The "reds" are anhydrides of the tannins. These compds. are more insol. the more anhydrous they become. "Reds" are more sol. in hot than in cold water and are allied to the coloring matters of the materials in which they are found. Some of the more sol. ones are used both for coloring and tanning agents. The methods for utilizing the "reds" in tanning consist in treating them with dil. alkalies, alk. carbonates, and sulfites and are applied especially to quebracho and hemlock. Many exts. called "Mimosa" exts. are simply quebracho or quebracho and mangrove exts. made sol. by treatment with sulfites. These exts. bleach sole leather because the H_2SO_3 prevents oxidation of the tan. They are antiseptic and prevent the formation of natural acids causing the necessity of adding acid artifically. A sulfited ext. has the odor of SO_2 when warmed with dil. HCl. The free SO_2 is detd. by b. the soln. and absorbing the evolved SO_2 in a weak alkali, then estg. the amt. by standard I and $Na_2S_2O_3$ solns. The combined SO_2 is detd. in the same way after being liberated by acidifying the soln. J. S. ROGERS.

The Analysis of Lime Liquors. HUGH G. BENNETT. *Shoe Leather Rep.*, 103, 43–5.—Since lime liquors are always solns. satd. with lime there is little object in repeatedly detg. the lime present. It is by a study of the nitrogenous organic matter which accumulates during use that these liquors are differentiated. In detg. N it is frequently overlooked that the dissolved nitrogenous organic matter embraces all the stages in the decomp. of proteins, and that these products are derived from different sources of different chem. nature and are not all from the gelatinous hide fiber and a dead loss to the tanner. Since NH_3 is present to considerable extent, its detn. should be some criterion of lime liquors although its solvent and depilatory effect is small. Peptones, total lime, and caustic lime may also be detd. but it is the bacterial activity of the soln. which in reality gives to the lime liquor its solvent and unhairing effect. A simple method of testing lime liquors is titration with standard acid and phenolph. B. suggests the use of methyl orange in addition to the phenolph. for detg. the weaker bases. An infusion of alizarin paste makes a good indicator. It is accurate for NH_3 and more sensitive to both weak acids and weak bases. The change from violet to yellow in the case of alizarin takes place at a H^+ conc. of 10^{-11} N, the change with phenolph. at 10^{-9} N. The color change with alizarin is very sharp. If organic amines were present they would be detd. as NH_3. Alizarin is pptd. by a

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conc. lime soln. This difficulty may be overcome in any of the following ways: (1) By adding phenolph. and titrating until the pink just disappears, then adding the alizarin and completing the titration as usual, (2) by adding enough acid to neutralize the satd. lime soln., (3) by making a preliminary titration and then adding the alizarin when the soln. is nearly neutral. The procedure suggested is as follows: Pipet 100 cc. into a white porcelain dish, add 1 drop of 1% alcoholic phenolph. and run in *N* HCl until pink color just disappears, add 2 drops 2% infusion of alizarin paste with water and continue the titration until the violet sharply changes to yellow. Note the results, add one drop of 1% methyl orange and continue the titration to first change of yellow to red. Note the result. The alkalinity to alizarin gives caustic lime and NH_3. 100 cc. of satd. lime soln. require 4.6 cc. *N* HCl for neutralization. This amt. when deducted from the total amt. of *N* acid required for the alizarin end point gives the NH_3. The weak bases are obtained by subtracting the alkalinity to alizarin from the alkalinity to methyl orange. J. S. Rogers.

"Dry Dyeing" of Leather and Furs. Interesting Summary of Novel Methods. Anon. *Leather*, 3, 622–3.—In "Lains et Cuirs" a method for dyeing skins and furs is described. The dye is applied by means of an organic solvent, usually benzene on account of price and general adaptability. Basic dyes are converted into "grease-dyes" so as to be sol. in benzene by dissolving them in water, adding an aq. soln. of an oil soap, cooling, and adding HCl which ppts. the fatty acid of the soap along with the "grease-dye." After standing, the ppt. is withdrawn, washed and dried, then dissolved in benzene or benzoline and the goods dyed by immersion or by brush application. It is very difficult to remove any excess of the dye. Acid colors, as the sulfonated triphenyl methane colors, which are directly sol. in alc. may be used by adding saponine to the benzene making the benzene and alc. miscible. Waxed leathers may be dyed directly by this method. J. S. Rogers.

Methods of Dyeing Leather. The Advantages of the Tray Drum and Paddle Methods. C. B. Britton. *Leather*, 3, 623.—In the tray method the skins can be constantly observed, individual skins can receive attention, and the flesh side may be kept free from dye if desired. The use of the drum is economical in time, labor and dye. Large packs can be worked and there is no rapid drop in temp. The paddle method although wasteful of dye, excels the tray method in that larger packs may be put through with less labor and loss of heat. It excels the drum method for book calf in not knocking the skins about. J. S. Rogers.

Insects Destructive to Books. W. R. Reinick. *Am. J. Pharm.*, 83, 503–15.—Binding material treated with strychnine, quinine and $HgCl_2$ was not proof against destruction by insects. H. C. Fuller.

U. S., 1,009,881, Nov. 28. W. H. Allen, Detroit, Mich. **Drying leather.**

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30. PATENTS.

Abstracts of patents are included under the foregoing divisions of the Journal. The abstracts of U. S. patents are prepared by Earl T. Ragan, those of the British, French and German patents by O. D. Swett and those of Canadian patents by Russell S. Smart, of Fetherstonhaugh & Co., Ottawa (5 Elgin St.). The abstracts of French patents are prepared, with permission, on the basis of the abstracts in *Chemiker-Zeitung*, those of German patents from *Chemiker-Zeitung* and *Chemisches Zentralblatt*.

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Rue des Frances-Bourgeois, Paris for patents of the years 1902–7 and to L'Imprimerie Nationale, 87 rue Vieille du Temple, Paris, for those of later date; German, one mark, sent to Patent Office, Berlin; British, eight pence, sent to Patent Office, London. Extra postage (usually a halfpenny per patent) should accompany order for British patents to be sent outside of the United Kingdom. Of Canadian patents manuscript copies only are obtainable, the cost being 30 cents a page of specification (with a maximum total of $4) plus 25 cents per page of drawing. These copies may be ordered of Fetherstonhaugh & Co. or the Commissioner of Patents direct. Estimates of cost can be obtained in advance.

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CHEMICAL ABSTRACTS

Vol. 6. MARCH 10, 1912. No. 5

I. APPARATUS.

L. C. JONES.

An Automatic Pipet. T. O. SMITH. N. H. Agr. Expt. Sta. *J. Ind. Eng. Chem.*, 4, 47.—An air-level controlled buret. H. V. MAIN.

A Jointless Stock-bottle-support Buret. NORMAN ROBERTS. Hygienic Lab., Washington. *J. Am. Chem. Soc.*, 34, 49–51.—An elongated container having a buret fused onto it at the top. H. V. MAIN.

A New Funnel. PHILIP BLACKMAN. *Chem. News*, 104, 312: *Chem. Ztg.*, 36, 78. —A truncated cone without stem or cylinder (cf. *C. A.*, 5, 3183–4). H. V. M.

A New Melting-point Apparatus. D. S. PRATT. Cornell Univ. *J. Ind. Eng. Chem.*, 4, 47.—An electrically heated Thiele tube. H. V. M.

Filtration with Alundum Plates. RAYMOND C. BENNER AND WILLIAM H. ROSS. Univ. Ariz. *J. Am. Chem. Soc.*, 34, 51.—Norton alundum porous plates used for Witte plates and asbestos. H. V. M.

Counter-current Reflux Condenser. ANON. *Chem. Ztg.*, 35, 1255.—The H_2O-pocket is inside the cooler and the walls are blown spirally (*C. A.*, 5, 1693). A closely fitting double inner tube extends to the bottom of the pocket. The H_2O enters the top of the pocket, follows the spiral to the bottom and is discharged at the top of the cooler through the inner double tube. J. H. MOORE.

Decantation Apparatus. M. FREUND. *Chem. Ztg.*, 35, 1308. J. H. M.

Simplification of Air Entrance to Drawing-off Apparatus. A. SCHMIDT. *Chem. Ztg.*, 35, 1300.—In app. where the cock is placed in a neck between a reservoir and buret air is admitted to the latter when being emptied by having a hole bored through the plug of the cock in such a way that when the cock is closed the hole connects the buret with the air through a hole in the sheath of the cock. J. H. M.

Electric Heater for Ether Extractions. W. H. ROSS. *J. Ind. Eng. Chem.*, 3, 929–30.—The heater consists of an ebonized asbestos box within which is a sheet-iron box for holding the distilling flasks. Beneath the iron box is the wire system so arranged that 3 different resistances may be used and the temp. controlled. Advantages and 2 illustrations are given. C. C. WILCOX.

An Improved Extractor. C. A. JACOBSON. *J. Am. Chem. Soc.*, 33, 2051–2.—This app. was designed to overcome the siphoning difficulties encountered when using the Yocum extractor in extracting alfalfa meal and similar extractions. Other advantages and 1 illustration are given. C. C. W.

Notes on Thermostats. HUGH MARSHALL. *Chem. News*, 104, 295–6.—M. uses long-stem elec. lights, under run, with contacts outside of bath for ordinary temps. For 0° ice is used in bottom of bath. For 0–25°, put warm bath inside of 0° bath. H. V. MAIN.

Notes on Thermostats and Devices Used in Connection with Thermostats. CHARLES ALEXANDER CUMMING. *Chem. News*, 104, 307–9.—Review. H. V. MAIN.

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Apparatus for Continuous Fractional Distillation in a Vacuum. L. FRANCESCONI AND E. SERNAGIOTTO. *Gazz. chim. ital.*, 41, II, 415–9; cf. *C. A.*, 5, 3360.
CHAS. A. ROUILLER.

Apparatus for Electro-analytical Determinations with the Mercury Cathode. P. BAUMANN. *Chem. Ztg.*, 35, 854–5.—The cathode consists of a glass cylinder of 40 mm. diam., 70 mm. high, walls 1 mm. thick, 80 cc. cap., in which are placed about 60 g. Hg. Near the bottom is fused a Pt wire extending inside 1 cm., the outer end being bent back and fused to the cylinder about 5 mm. above, thus forming a loop into which the contact wire is hooked. Opposit the wire and 4 mm. from the bottom is a tubulure in which may be a ground stopper or a downward-bent tube with cock for drawing off the electrolyte. The rotating anode consists of a Pt wire 2 mm. in diam. and 85 mm. long., carrying 2 discs of Pt gauze 3 mm. apart, firmly attached to the wire. An elec. heater which may be placed in the cylinder is made by enclosing a Pt wire of 0.5 ohm resistance in a glass tube filled with paraffin oil. The heater is supplied by R. Goetze, Leipzig; the Hg cylinder by Schott & Gen., Jena; the anode by W. C. Heraeus, Hanau.
J. H. MOORE.

Apparatus for Carrying out Reactions with Exclusion of Air. J. A. SIEMSSEN. *Chem. Ztg.*, 35, 1317.—An Erlenmeyer flask with hollow ground stopper having 2 internal tubes fused on opposit sides and reaching a short distance down into the flask. Corresponding to these tubes are 2 others fused to the outside of the neck, and bent upward, one carrying a separatory funnel for introducing the reagents and the other for admitting inert gas, the gas escaping through the funnel. J. H. MOORE.

Automatic Universal Filling Apparatus. E. SCHIRM. *Chem. Ztg.*, 35, 1333.—An app. on the principle of the Mariotte flask for holding a const. level while evapg. or distilling large vols. of liquid, or for continuous washing of ppts. J. H. MOORE.

Apparatus for Nitrogen Determination According to Kjeldahl. L. DOBRZYNSKI. *Chem. Ztg.*, 35, 1267.—D. recommends using cast-Fe distillation flasks because the operation is hastened, the substance, decomposed with conc. H_2SO_4, may be poured and washed into the Fe flask without cooling, the operation does not require careful regulation since there is no danger of bumping or frothing over, and the addition of Zn dust is unnecessary. Flasks should be 230 mm. high, 135 mm. diam. at bottom, 40 mm. diam. at mouth and walls about 5 mm. thick. A flask will last for several hundred analyses. J. H. MOORE.

Temperature Measurements with a Resistance Thermometer. A. A. DECKERT. *Elektrochem. Z.*, 18, 91, 126, 160.—D. describes a Pt resistance thermometer and a melting furnace and gives the details of expts. with low and high temp. measurements.
W. E. RUDER.

Remote Controlled Temperature or Pressure Recorder. ANON. *Elec. World*, 59, 64.—An elec. means for automatically recording variations in temp. or pressure at a distance from the controlled point. For temp. an Hg contact thermometer is used, while the liquid-metal type of manometer is applied for pressure. The change in temp. or pressure effects a corresponding opening or closing of elec. circuits connected to the solenoids on the distant registering app. These control a moving system of stylus and pointer giving a direct reading on a scale, and at the same time recording with the stylus. A number of recording devices may be operated from 1 thermometer or manometer.
W. L. VAN KEUREN.

A Still for Absolute Alcohol. RALPH H. MCKEE. Univ. Maine. *J. Ind. Eng. Chem.*, 4, 46.—A simple steam-heated still. H. V. MAIN.

A New Rectifier. BONNEL. *Rev. chim. ind.*, 22, 116.—Distilling vapor passes through a series of hexagonal tubes, horizontally placed above each other in a bath,

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the temp. of which is under accurate control. The tubes are joined to make one continuous pipe in which a large surface is exposed to the vapors ascending from the retort. Advantages claimed are economy of fuel (50%) and rapidity of operation.
J. S. GOLDBAUM.

Laboratory Milling Machine for Sampling Steel. C. M. JOHNSON. *J. Ind. Eng. Chem.*, 3, 932.—This machine consists of a set of milling cutters which revolve rapidly against the tightly held wire, sheet, or other piece of metal to be sampled and cut off particles evenly and so fine that no sifting is required to bring the sample to right form for analysis. Rapidity and accuracy in the prep. of the samples and cheapness of the machine are its advantages. C. C. WILCOX.

U. S., 1,013,249, Jan. 2. P. F. WILLIS. **Acetylene generator.**

U. S., 1,013,520, Jan. 2. J. W. SILVER. **Acetylene generator.**

U. S., 1,013,752, Jan. 2. E. W. DUNHAM. **Acetylene generator.**

U. S., 1,014,010, Jan. 9. T. W. LACY. **Acetylene generator.**

U. S., 1,014,048, Jan. 9. H. A. BYERS. **Acetylene generator.**

U. S., 1,014,241, Jan. 9. C. O. MAILLOUX and H. J. WESTOVER. **Automatic indicating gas analyzer.**

U. S., 1,014,333, Jan. 9. O. SAEGER. **Machine for cleaning muffles or zinc furnaces.**

U. S., 1,014,715, Jan. 16. I. MUMMA. **Acetylene generator.**

U. S., 1,014,757, Jan. 16. F. G. KEYES and C. A. KRAUS. **Seal for fused silica vessels.**

U. S., 1,014,843, Jan. 16. H. D. NOBLES. **Grease filter.**

U. S., 1,015,091, Jan. 16. W. S. SIMPSON. **Apparatus for melting and mixing metals in vacuo.**

Ger., 230,721, Sept. 1, 1908. H. RESCH SOHN and C. R. O. GUTSCH. App. for **washing and rinsing with benzine**, comprizing a vessel with sides converging downwards to an outlet.

Ger., 231,389, May 12, 1910. Addition to 217,805. E. GRUBE. **Oil-vapor burner for soldering, welding and cutting metals.**

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2. GENERAL AND PHYSICAL CHEMISTRY.

JOHN JOHNSTON.

Sir William Crookes. ANON. *Elec. Rev. West. Elec.*, 59, 1317.—Biographical.
C. G. F.

Hans Heinrich Landolt. RICHARD PRIBRAM. *Ber.*, 44, 3337–94.—Obituary.
E. J. C.

Willy Wien. S. VALENTINER. *Chem. Ztg.*, 35, 1363.—Nobel prize winner for physics in 1911. E. J. C.

Theoretical Electricity. II. A. GEHRTS. *Fortschritte Chem.*, 4, 361–9.—Review for the period Jan.–June, 1911, under the headings: Methods of measurement; magnetic properties of substances; elec. oscillations. J. J.

Thermochemistry. H. VON WARTENBERG. *Fortschritte Chem.*, 4, 371–80.—Review covering the period Apr.–Oct., 1911. J. J.

The Viscosity of Gas Mixtures. E. THOMSEN. Kiel. *Ann. Physik*, 36, 815–33.

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—According to Puluj's equation, when a light gas is added to a heavy gas the viscosity of the mixt. becomes greater than for the heavy gas alone; increases to a max. as more of the lighter gas is added and then decreases. However, if the viscosities of the gases are very greatly different, the equation indicates that the viscosity acts normally, and gives no increase to a max. Thus when H is mixed with C_2H_4 or NH_3 the viscosity should rize to a max.; the same should be the case when NH_3 is added to C_2H_4, but there should be no increase when H is added to O or N. The experimental results confirm the equation in a qual. sense, but the quant. agreement is not at all close.

W. D. HARKINS.

Role of Diffusion and Analogy between Solutions and Association of Electricity and Matter. G. M. LAFERLA. *Rev. gén. chim.*, 14, 368–70.—The term diffusion is applied to the movement of any substance whatever through any other substance, this movement being detd. solely by the unequal distribution of the diffusing substance in contiguous portions of the diluent. The validity of this generalization is believed to be supported by the kinetic theory of gases and of solns. and by certain instances of the diffusion of solids (*e. g.*, $Na_2SO_4.10H_2O$ through $Na_2SO_4.7H_2O$, cf. *C. A.*, 4, 267). As a further extension of this idea of "diffusion," the relation between elec. and matter is regarded from the standpoint that the atoms and the space surrounding them act as immiscible diluents, while the electrons have the power of "diffusion" and thus behave like a substance in soln. The motion of electrons, diffusion of gases, diffusion of substances in soln., etc., are therefore regarded as different aspects of the same general law.

H. S. PAINE.

A General Relation between the Physical Properties of Substances: Application to Densities. G. TER GAZARIAN. *Compt. rend.*, 153, 871–4.—In a previous paper (*C. A.*, 2, 2759) the author has shown that "at temps. equally removed from their critical points the members of a homologous series possess equal d." This rule was found to hold fairly well, although discrepancies were observed with the higher members of a series. From an extended study of the physical properties of a large number of substances the author is led to announce the following general law: that "at temps. equally removed from the critical points the quotient of the numbers representing any physical property for two substances varies linearly with the temp." Mathematically this relation may be expressed by the equation $Q_2 = Q_1 + c(t_2 - t_1)$, c being either positive or negative, and Q_2 and Q_1 being the quotients at the temps. t_2 and t_1, resp. This relation has been tested in the case of the ds. of NH_3, CO_2, benzene, HOAc, and pentane. With the pentane, which was chosen as standard, the agreement between the observed and calc. values is excellent.

J. HUNT WILSON.

A Correlation of the Elastic Behavior of Metals with Certain of their Physical Constants. JOHN JOHNSTON. Geophysical Lab., Washington. *J. Wash. Acad. Sci.*, 1, 260–7.—The following equation, which is derived thermodynamically, expresses the influence of pressure on the m. p. of a solid when the pressure acts on the solid phase but not on the liquid: $\Delta T_1/\Delta P = T_1/41.30Q_1D_1$, where T_1 is m. p. at atm. pressure, Q_1 the latent heat of melting and D_1 density at ordinary temp. and pressure. By the aid of this equation the author calculates the pressure in atm. which, acting on the solid alone, would be required to produce melting at 25° for all the metals for which the necessary data are available, as follows: K, 64; Na, 266; Pb, 1760; Sn, 2200; Bi, 3000; Cd, 3300; Al, 5100; Zn, 6900; Ag, 14000; Cu, 24000; Pd, 31000; Pt, 46000. A table is given which shows that this order is the order of decreasing ease of flow under pressure, decreasing compressibility and increasing hardness, tensil strength, elastic limit, Young's modulus of elasticity and rigidity modulus, with a few exceptions, which are so few in number and irregular in occurrence that they are probably due to errors in the data. It is therefore probable that when a metal undergoes mechanical deforma-

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tion there is an actual melting of the metal which then flows into the interstices where the pressure is smaller. The liquid then solidifies with the formation in general of very small crystals owing to the very rapid rate of recrystn. This conception is consistent with the fact that metals which have been strained are more fine grained and possess greater rigidity and d. than unstrained metals. GRINNELL JONES.

Thermal Molecular Motion in Solid Bodies. A. EINSTEIN. Prag. *Ann. Physik*, 35, 679–94; cf. *C. A.*, 5, 2763.—Nernst and his collaborators have found that there is a systematic divergence between the observed variation of sp. heat with temp. and that calc. from the original Einstein formula; and have proposed a modified form of equation. Einstein now shows that this divergence is a consequence of the fact that the mol. motions are far from monochromatic vibrations, and that the expression, as modified by Nernst, is identical with the original form if, instead of assuming a single value of the frequency, we make use of what is in effect a mean value. It is further shown that Einstein's formula for calcg. the frequency, and also the Lindemann formula (*C. A.*, 4, 2593) can be derived from dimensional considerations; the order of magnitude of the constant factor can even be deduced in this way. The laws of heat cond. in cryst. insulators are not in harmony with mol. mechanics. The order of magnitude of the observed heat cond. can be derived by a similar consideration of the dimensions involved; from which it would appear that the heat cond. of monoatomic solid substances is dependent upon their at. wt., at. vol., and frequency. J. JOHNSTON.

The Relation of the Thermal Coefficients of Expansion to the Specific Heat of Solid Elements. E. GRÜNEISEN. *Ber. physik. Ges.*, 1911, 426–30.—By a mathematical analysis based on Einstein's heat theory of sp. heats, and the Nernst heat theorem, G. reaches the conclusion: $\partial V/\partial T = (C_p/\nu)\partial\nu/\partial p$. The coeff. of expansion equals the sp. heat multiplied by the relative change in the vibration frequency with pressure. Therefore, at const. pressure, the ratio of coeff. of expansion to the sp. heat is a const. independent of the temp. G. has previously found this relation experimentally (*C. A.*, 2, 2476; 4, 3031). He also reaches the conclusion that $\partial\nu/\partial p$ is about twice as great as $\partial V/\partial p$. GRINNELL JONES.

Relations between the Atomic Heat, Coefficient of Expansion and Compressibility of Solid Elements. E. GRÜNEISEN. *Ber. physik. Ges.*, 1911, 491–503; cf. preceding abstr.—By means of values taken from his own work with Cu, Pt and Fe, the author shows that the change of compressibility with temp. is detd. largely—at least at low temps.—by the variation of the coeff. of expansion with the temp., and by the dependence of the frequency upon the pressure. For monoatomic elements the relation is derived that the relative rise in temp. produced by adiabatic compression is equal to the relative change of frequency. The at. heat is a function of the temp. and of the frequency; the latter is dependent upon the vol. At low temps. the coeff. of expansion is very small, so that in this region the frequency is dependent mainly upon the pressure. J. JOHNSTON.

Specific Heats and the Theory of Energy Units. W. NERNST AND F. A. LINDEMANN. Phys. Chem. Inst., Univ. Berlin. *Z. Elektrochem.*, 17, 817–27.—The original Einstein formula for at. heat capacity, or the Nernst-Lindemann (*C. A.*, 5, 2764) modification of it, gives C_v, whereas measurements give C_p. The difference is negligible at liquid air temp. or below and has been neglected in the previous papers. As is well known, $C_p = C_v + 9\alpha^2VT/K$ (where α is coeff. of expansion; K, compressibility; and V, at. vol.); V/K can be considered independent of T with sufficient accuracy, since only a small correction term is involved. According to Grüneisen, α is proportional to C_p, so that $C_p = C_v + TC_p^2A$, where A is a const. for any given substance. The application of this correction gives much better agreement between calc. and abs.

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results at room temp. The calc. is made for Al, Cu, Ag, Pb, Pt, NaCl, KCl, KBr, HgCl, and diamond. By combining relations due to Mie (*Ann. Physik*, 11, 687), Einstein (*C. A.*, 5, 2763), and Lindemann (*C. A.*, 4, 2593), it is found that $A = 0.0214/T_s$ (T_s = m. p.). This relation is useful for the approx. calc. of A in cases in which α and K are unknown. It is pointed out that for elements, with a few exceptions, only a single value of ν needs to be used in the calc., whereas for salts 2 values of ν are necessary. The theoretical significance of the new formula is discussed from the standpoints of the relation between the kinetic and potential energy of mol. vibrations and of Maxwell's law of distribution of velocity among the mols. The hypothesis of energy units is applied to the energy of rotation of a gaseous mol. and the method of calcg. the frequency of rotation indicated. They conclude that C_v for a O_2 mol. at 1.82° abs. is still 90% of its value at room temp. It is pointed out that the revized Dulong-Petit law and the new heat capacity formula makes it possible to calc. at. wts. from sp. heats with much greater accuracy than has been possible heretofore. GRINNELL JONES.

The Plasticity of Ice. HANS HESS. Nürnberg. *Ann. Physik*, 36, 449–93.—In continuation of previous work (*Ann. Physik*, 8, 405), H. has made further measurements of the plasticity of ice. The ice was placed in the bore of a thick-walled steel cylinder into which fitted plungers with holes of various sizes drilled axially through it. The cylinder was surrounded by a bath which could be maintained constant at various temps. below 0°. A great number of measurements were made of the rate of descent of the plunger at different pressures and temps. In general, it was observed that, at const. temp. the velocity of the plunger increased rapidly with increasing pressure, and that at const. pressure the velocity increased rapidly with increasing temp. H. found, as Tammann previously had also observed, that at a given temp. a considerable movement of the plunger takes place under a pressure much lower than that deduced thermodynamically (on the assumption that the pressure acts equally on both the ice and the water produced by the melting) and the ice shows under these conditions indisputable evidence of having been *melted*. L. H. ADAMS.

Molecular Heat of Fusion. E. BAUD. *Compt. rend.*, 152, 1480–3.—A discussion of the various formulas which have been proposed to show the relation between mol. heat of fusion, abs. temp. of fusion, and other properties. Expts. on substances which show themselves normal in the liquid state (those which satisfy the expression, $\Delta t = k \log x\, T_s$, deduced by the author (*C. A.*, 4, 2407)), have shown that none of these are satisfactory. If it be assumed that the atoms occupy the same space in the liquid and solid at the m. p., the variation in the mol. vol. at the moment of solidification is the difference in the co-vols. of liquid and solid. By substituting the difference in the mol. vols. in the Clapeyron equation and assuming that the co-vols. vary directly with the abs. temp. the equation (for the temp. 15°), $p = 288Q/T(V-V')_{15}$, is deduced. At a fixed pressure this becomes $Q/T = K/(V-V')_{15}$.
R. H. JESSE, JR.

Answer to a Criticism of A. Mazzucchelli: "Concerning a Recent Study of the Index of Refraction of Binary Mixtures." F. SCHWERS. *Atti accad. Lincei*, 20, II, 510–8; cf. Mazzucchelli, *C. A.*, 5, 3365. CHAS. A. ROUILLER.

The Molecular Refraction of Compounds Containing Nitrogen. H. DUVAL. *Compt. rend.*, 153, 874–5.—Detns. have been made of the mol. refraction for a few N compds., both pure and in soln., with reference to the influence of the solvent, the position of the substituents, and the temp. The results may be summarized as follows: (1) The solvent appears to exert an appreciable influence on the value of the at. refraction; (2) the difference in the mol. refraction accompanying a change of substituent from the *o*- to the *m*-position is not sufficient to account for a pronounced difference of constitution; (3) rise in temp. is accompanied by a slight rise in the values

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of the mol. refraction; (4) the calc. values, using the number for N given by Brühl, are all slightly lower than those observed. In the measurements with the pure substances the ray of Li (λ = 6705) was used owing to the opacity of the substances for the D ray of Na. J. HUNT WILSON.

The Formation of Positive Ions on Heated Metals. Z. KLEMENSIEWICZ. Inst. Physik. Chem., Karlsruhe. *Ann. Physik*, 36, 796–814.—Thin wires of different metals were charged to 500 v. in different gases and *in vacuo*, and were heated electrically, mostly at 800°. The positive ionization was measured by an Exner leaf electroscope which was connected with an auxiliary electrode contained in the same tube as the wire. 100 g. metal absorb about 1 mg. of gas; it is the driving out of this absorbed gas which causes the + ionization. Heating the wire increases the gas pressure inside it, and also increases the velocity of diffusion. Positively charged mols. are forced out of the metal (probably O_2^+, N_2^+, CO^+, or H_2^+), but it seems probable that uncharged mols. are also expelled. The + ionization depends upon the nature and the conc. of the gas, and falls off very rapidly with the time. The ionization found after wires had remained for 3 weeks in a vacuum, was very slight and decreased rapidly, and was undoubtedly due to the air absorbed by the wire in passing from the app. to the evacuated tube. Artificial saturation with a gas was produced by first heating the wire in a vacuum and then heating to 200° in the gas. The ionization due to artificial satn. with a gas decreases much more rapidly than that of a new wire; this seems due to the formation of a surface layer of peculiar properties due to the mechanical pressure when the wire is drawn. Positive ions are sepd. at lower temps. than negative ions; this indicates that the amt. of work necessary to sep. the + ions is less. Noble metals give off electrons in a vacuum only above 900°, but in H_2 they are given off at 800°. The effect of the H_2 is not due to the dissolved gas, but to that outside on the surface of the metal, which in some way seems to lessen the expenditure of work necessary for the sepn. of the electrons. It was found that the chem. actions in the formation and decomp. of PdO and IrO_2 do not cause any perceptible formation of positive or negative ions. This is contrary to what might have been expected (cf. *C. A.*, 6, 8).
W. D. HARKINS.

Quasi-association or Molecule-complexes. I. J. D. VAN DER WAALS. *Proc. Akad. Wetenschappen*, 13, 107–34.—Recent investigations of the Brownian movement having shown that large mol. complexes behave kinetically as a single mol., a corresponding modification of the van der Waals' equation of state is necessary in the case of associated liquids. The author compares the deductions obtained from his equation of state with the experimental facts (using Young's data on Et_2O) and arrives at the following results: (1) The van der Waals' equation of state "is not sufficient in the liquid state with a and b independent of T and b a function of the vol." (2) "The assumption of a and b as functions of T is not sufficient to explain the deviation." (3) Two new empirical formulas for the detn. of liquid and vapor d. of coexisting phases are obtained; the author's thermodynamic theory of capillarity is found to require revision. (4) If b is assumed to be a function of the vol. the expression for the critical vol. becomes $V_k = 2.13\ b_g$, instead of $3b_g$, as formerly. The expressions for RT_k and P_k, however, do not change. (5) The term *quasi-association* is applied to loose mol. complexes which must be regarded as individuals from the kinetic standpoint. If the xth part of the total number of mols. exist as complexes made up of n mols. each, then the equation of state will have the form, $p = RT(1-(n-1)x/n)/(v-b) - a(1-(1-k)x)^2/v^2$, in which b is an unknown function of v and x, and k is a constant (= ½ approx.) expressing the attraction of the complex mols. for one another and for the simple mols. (6) The detn. of x for given v and T, the possible values of n, and the values of x_1 and x_2 for coexisting phases, are considered. Among

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the conclusions, most of which cannot be briefly stated, are the following: $n > T(dp/dT)/p$ at the critical point. In the accurate detn. of mol. wts. from gas d. below T_k, it is not sufficient to correct for the existence of a and b, but the value of x must also be detd., which can be done by heating at constant vol., under which conditions a and b remain const. but x decreases rapidly. E. W. WASHBURN.

Quasi-association of Molecule-complexes. II. J. D. VAN DER WAALS. *Proc. Akad. Wetenschappen*, 13, 494–506.—The theoretical considerations of the preceding paper are extended to (1) a substance in quasi-association considered as a binary system, and (2) shape of the Ψ-surface. The value 7/3, assumed by Kleeman for the mol. thermodynamic potential, μ, is not large enough to account for the behavior of many liquids at the critical point, and we are obliged to introduce the assumption of quasi-association. E. W. WASHBURN.

Appearance of a Maximum and Minimum Pressure with Heterogeneous Equilibria at a Constant Temperature. F. E. C. SCHEFFER. *Proc. Akad. Wetenschappen*, 13, 31–4.—Wholly theoretical. D. A. MACINNES.

The Continuous Connection between the Three-phase Lines which Indicate the Equilibria between the Two Components in the Solid Condition with Liquid and Vapor Respectively in a Binary System. F. E. C. SCHEFFER. *Proc. Akad. Wetenschappen*, 13, 158–62; cf. *C. A.*, 5, 2358.—Theoretical. D. A. MACINNES.

The Relation between the Limit of Molecular Conductance and Viscosity. P. WALDEN. *Z. physik. Chem.*, 78, 257–83.—W. shows that his relation, $\Lambda_0\eta_0$ = const. (Λ_0 = mol. cond. at zero conc., η_0 = viscosity of the solvent), has been deduced theoretically from Stokes' law, and also follows directly from a relation derived by Einstein connecting the coeff. of diffusion and the mol. vol. Experimentally it is found to hold for substances such as NEt_4I, which give large ions, and for solvents which are unassociated and have low dielectric constants. For aq. solns. of KI the product $\Lambda_0\eta_0$ is only approx. constant through the temp. range 0° to 100°, but the relations $\Lambda_0\eta_0/x = K$ and $\Lambda_0\eta_0 x/\epsilon = K$ (x and ϵ are the association factor and the dielectric const. resp.) give better accord with the detns. The results of detns. of Λ_0 at 25° of $N(C_3H_7)_4I$ in various solvents follow: $PhCH_2CN$, 31.8; PhCN, 52.2; $PhNO_2$, 35.0; isobutyl alc., 21.3; aceto acetic ester, 40.2; *m*-chloroaniline, 18.0; and ethylene chloride, 78.6. These solns. all follow the simple relation given above. The heat of ionization of NaI (calculated from the change of ionization with the temp.) was found to be approx. the same in different unassociated solvents.

D. A. MACINNES.

Studies in Ammonium Solutions. I. An Ammonium Electrode. R. E. SLADE. Muspratt Lab., Liverpool. *J. Chem. Soc.*, 99, 1974–82; *Proc.*, 27, 242.—An ammonium electrode was formed by passing the gases NH_3 and H_2 over Pt electrodes immersed in a soln. of NH_4Cl, and its potential against a normal calomel electrode was measured. The NH_3 of definit pressure was obtained by passing a current of air through a soln. of known conc. of NH_3 and then through the cell. The single potential of the ammonium electrode, *i. e.*, H_2 and NH_3 gases both at 1 atm. pressure and the soln. 1 *N* with respect to NH_4^+ ions, was found to be −0.486 ± 0.004 (H electrode = zero). The conc. of the NH_4Cl was varied from 1 to 0.08 *N* and the partial pressure of the NH_3 from 27.4 to 0.13 mm. As the data obtained can be used to calc. the ratios of the H^+ ion concs. in the different solns. the possibility of an equil. of the type $xNH_3 + H^+ \rightleftarrows (NH_3)_xH^+$ was investigated. The value of x was found to differ little from 1 even in the more conc. solns. D. A. MACINNES.

The Oscillographic Study of some Electrolytic Processes. III. D. REICHINSTEIN. Zürich. *Z. Elektrochem.*, 16, 916–44; cf. *C. A.*, 4, 867; 5, 819, 3011.—A current is passed

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through a cell for a short time and the increase in potential due to polarization and the decay of the polarization after the current is interrupted are recorded as a function of time by means of an oscillograph. With the more sensitive instrument available for this work it was possible to make resistance of the instrument and the dimensions of the electrodes sufficiently large so that the depolarizing action of the current which operates the oscillograph becomes negligible. This makes the part of the curve showing the depolarization especially significant because it measures the velocity of the processes which produce depolarization. The following example illustrates the character of the results. A smooth Pt electrode in 28% H_2SO_4 was polarized as cathode for 0.027 sec. with a current of 0.12 amp. per cm^2.; this produced a constant polarization potential within 0.002 sec., but within 0.002 sec. after the current was interrupted the polarization had entirely disappeared. The anodic polarization under the same conditions is nearly three times as great and is attained more slowly; 0.127 sec. after the interruption of the current the polarization had not entirely disappeared. This shows that the formation of H_2 from the primary products of the electrolysis (probably H or Pt-H alloys) is a much more rapid process than the corresponding process for O. Cathodic polarization in H_2SO_4 diminishes much slower on Hg electrodes than on Pt electrodes and still slower on Ag electrodes. The rate of depolarization on Pd electrodes is influenced greatly by the amt. of H contained in the Pd, and also by the addition of a Zn salt to the electrolyte, which enables R. to draw conclusions in regard to the mechanism of the process. In the anodic polarization of base metals the nature of the anion has a much greater influence on the polarization than on the equil. potentials. In general, the polarization is less with nitrate solns. than with acetate or sulfate solns. under the same conditions. The anodic polarization of Ni in the active and passive state was studied. In the passive state periodic changes in the polarization were observed. The phenomena of polarization in current-producing cells are very similar to polarization in cells operated by external e. m. f. but of opposit sign. In the case of the anodic polarization of Pt electrodes in H_2SO_4, R. calc. by means of the Nernst equation the conc. of the electromotively active substance at intervals of time. He finds that during 0.06 sec. the conc. decreases from $4 \times 10^{+10}$ down to 6×10^{-14}. [It would be better to speak of "activity" instead of conc. since a conc. of 10^{10} is obviously absurd. He means that the substance acts electromotively as if it had a conc. of 10^{16} as calc. according to the Nernst equation.—Abstr.] The velocity const. of the reaction is calc. on the assumption that it is a reaction of the first order; the values of the constant only vary from 1234 to 526, which must be considered remarkable agreement in view of the enormous range in conc. (calc. on the assumption that the reaction is of the second order gives values of the velocity constant varying from 5×10^{-18} to $3 \times 10^{+14}$). The author concludes that in general the depolarization following the interruption of the current is produced by some very rapid chem. reaction and not by diffusion. Electrolytic processes are characterized by an asynchronism between the primary electrical reaction and a succeeding chem. reaction which is responsible for the phenomena of polarization. Grinnell Jones.

The Viscosity of Solutions of the Metal Ammonia Salts. Arthur A. Blanchard and Harold B. Pushee. Mass. Inst. Tech. *J. Am. Chem. Soc.*, 34, 28–32.—Previous work by one of the authors (*Ibid.*, 26, 1315) has shown that there seems to be a general principle that an increase in viscosity is due to an increase in the size of the mols. of a liquid, or to a decrease in their symmetry. The present paper presents measurements of the viscosities of solns. of NH_4Cl, $CaCl_2$, Li_2SO_4 and LiCl to which NH_3 in varying amounts had been added. The results show a slightly greater increase of viscosity with increasing conc. of NH_3 for the salt solns. than for pure H_2O.

L. H. Adams.

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Studies in Conductivity. I. The Conductivity of Ammonia in (Anhydrous) Formic Acid. I. "Formic Acid Hydrolysis." H. I. SCHLESINGER AND R. P. CALVERT. Univ. Chicago. *J. Am. Chem. Soc.*, 33, 1924–33.—The authors have prepared anhydrous formic acid, sp. cond. 6.86×10^{-6}; and have measured the cond. of solns. of NH_3 (ammonium formate) below 0.55 *N*, and of NH_4Cl below 0.25 *N*. The measurements were made in contact with dry air, but the complete prevention of the absorption of moisture is uncertain. Diln. was made by the Ostwald method with 10 cc. pipets. The solvent and the NH_4 formate have an ion in common, and the question of whether or not the cond. of the solvent should be subtracted is discussed. Since the cond. of the solvent was about 10% of the measured cond. of 0.01 *N* NH_3 soln., it was impossible to obtain accurate results in dilute solns. At higher concs. the mass law is approx. obeyed, and the salt is very highly ionized—about 90% at 0.1 *N*. The NH_4Cl is much less ionized and does not obey the mass law, but the phenomenon is complicated by the reaction with the solvent to form the base, NH_4 formate, and the slightly ionized acid, HCl. This equil. is analogous to hydrolysis in aq. solns. W. C. BRAY.

The Dissociation of Amphoteric Electrolytes. LENOR MICHAELIS. *Biochem. Z.*, 33, 182–9.—If K_a represent the acid, K_b the basic dissociation constant, and if C denote the proportion of undissociated mols. of an amphoteric electrolyte, then $C = 1/(1 + K_a)/[H^+] + K_b/[OH']$. If C be represented graphically as a function of log $[H^+]$ the form of the curve depends on the values of K_a and K_b, and remains the same when the product K_aK_b remains constant. The max. of the curves correspond to the isoelec. points. The smaller the value of K_aK_b the higher is the max. above the abscissas. When the value 10^{-18} is reached the max. does not for practical purposes differ from the absolute max. 1, in which case the substance is completely undissociated. As the value of the product K_aK_b declines from 10^{-18} the max. becomes broader and less distinct, so that for values of $K_aK_b < 10^{-18}$ there is no longer an isoelec. zone. The greater the value of K_aK_b the flatter the max. appears, so that for the value $K_aK_b = 10^{-12}$, C practically = 0, so that such an electrolyte can no longer exist in the undissociated state. In those cases in which C approaches very nearly the limiting value 1, the curve can be constructed by combining the curves found by considering the electrolyte, first as an acid, $C_a = 1/(1 + K_a/[H^+])$, and then as a base, $C_b = 1/(1 + K_b/[OH^-])$. Only near the point where the 2 curves cut is the resulting curve not an accurate representation. In electrolytes where $K_a.K_b < 10^{-14}$ not only at the isoelec. point but also in a broad zone right and left of this no dissociation can take place. This is the case with tyrosine, leucine and arsenious acid ($K_a.K_b = 1.10^{-20}$, 4.10^{-22}, 6.10^{-24}, resp.). *p*- and *m*-Aminobenzoic acids show distinct well defined maxima ($K_a.K_b = 2.8.10^{-17}$, $1.9.10^{-16}$). It would seem that substances where $K_a.K_b \gtrless 10^{-14}$ are not capable of existing. F. J. BIRCHARD.

The Temperature Coefficient of the Electrical Conductivity of Hydrogen Chloride in Alcoholic Solutions. J. R. PARTINGTON. Manchester. *J. Chem. Soc.*, 99, 1937–41; *Proc.*, 27, 247.—Detns. of the cond. of alc. solns. of HCl at 0° and 18° were made between the concs. 0.85 and 0.001 mol. per l., from which the following values of A_0 were obtained: 46.5 at 0° and 60.0 at 18°. These results gave 0.0185 as the temp. coeff. of mol. cond. D. A. MACINNES.

The Polarization of Solid Electrolytes. F. HABER AND J. ZAWADZKI. Inst. physik. Chem. Karlsruhe. *Z. physik. Chem.*, 78, 228–43.—When a solid Ag salt is used as an electrolyte with an Ag anode, there is considerable polarization at the phase boundary, and this increases rapidly as the temp. is lowered. When Ag_2SO_4 is used at the temp. of solid CO_2 the polarization is as great as when Pt or graphite is used as the electrode. When taken in connection with the principle of Haber and Russ (*Z. physik. Chem.*, 47, 257) that the exchange of charges at the electrodes is a process

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with a velocity const. which is practically infinit, these facts indicate that the process occurring at the electrode is inseparably bound up with some chem. process. This is not consistent with the view that Ag ions are formed directly from the metal. The current is carried from the electrolyte to the electrode by the transference of electrons from the anion. This results in the formation of highly oxidized substances (such as Ag persulfate or the halogens), and these undergo a secondary reaction with the Ag electrode. The mechanism of the transference of the current is exactly the same as when a current is passed through a gas at ordinary temps. It may therefore be supposed that the process occurs in the same way when the electrolyte is an aq. soln. or a fused salt. The consideration of the passive state will be considerably simplified by this hypothesis. W. D. HARKINS.

An Equilibrium in the Cobaltammines. ARTHUR B. LAMB AND JOHN W. MARDEN. Havemeyer Chem. Lab., N. Y. Univ. *J. Am. Chem. Soc.*, **33**, 1873–1911.—A study of the equil. between acidopentammine Co salts (purpureo), and the corresponding aquopentammine salts (roseo), and the velocities of the reactions, shows that the reaction is monomolecular, and the velocities of transformation little affected by the acidity of the soln. The velocity of transformation of the acido radical is independent of the radicals outside the complex. When the chloropentammine salt decomposes in aq. soln. both O_2 and N_2 are given off, and the decomp. proceeds to completion with only a partial reduction of the Co. The equil. is affected both by the conc. of Cl^- and that of the salt. Using the hypothesis that the purpureo chloride has the same degree of dissociation as $Ba(NO_3)_2$, and that the roseo salt is similar in ionization to $La(NO_3)_3$, the writers calc. the concs. of the various ions and un-ionized substances in aq. soln., but are unable to find an equil. const. unless they assume a conc. law similar to the Storch-Bancroft equation for electrolytic dissociation. They conclude that the equil. is comparable with the dissociation equil. of strong electrolytes. The Cl^- given off by the purpureo radical is replaced by an H_2O mol.; the same thing would be expected in the dissociation of an ordinary electrolyte. The change between the two modifications is necessarily connected with the absorption or evolution of H_2O. W. D. HARKINS.

The Solubility of Iodine in Aqueous Solutions of Bromides of Potassium and Sodium. JAMES M. BELL AND MELVILLE L. BUCKLEY. Univ. North Carolina. *J. Am. Chem. Soc.*, **34**, 10–4.—The solubility measurements described in this paper were made in order to det. whether double compds. of I with NaBr or KBr were indicated by the relation of the amt. of I dissolved to the conc. of the salt. The procedure followed was similar to that of Worley (cf. *J. Chem. Soc.*, **87**, 1107). The curves of results showing wt. of I dissolved as a function of the salt conc. are concave downwards for both NaBr and KBr; from the form of the curves it is concluded that if compds. of I and an alkali bromide exist in aq. soln. they are present in very minute quantities.

L. H. ADAMS.

The Solubility of Bromine in Aqueous Solutions of Sodium Bromide. JAMES M. BELL AND MELVILLE L. BUCKLEY. Univ. North Carolina. *J. Am. Chem. Soc.*, **34**, 14–5; cf. preceding abstr.—The solubility of Br in solns. of NaBr when plotted as a function of the NaBr conc. gives a curve which is concave upwards and is in general similar to the curve of Worley for Br in KBr solns. L. H. ADAMS.

Steric Influence, Static and Dynamic. I. Equilibria in the Formation of Anilides. OLIVER C. M. DAVIS. Chem. Lab., Univ. Bristol. *Z. physik. Chem.*, **78**, 353–68.—It is shown that aniline and it derivatives give completely reversible reactions with formic acid in an aq. pyridine soln., and that therefore the mass action const. has the same value when detd. from the reaction between the amine and the acid as when detd. by a decomp. of the anilide. If K = [anilide]/[amine][acid], it is found that this const. has the highest value for the *p*-compd. and the smallest for the *o*-compd. Thus

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the values for the chloroanilines are: *o*, 0.155; *m*, 1.23; *p*, 2.25. This shows that the configuration of the compds. has a very marked influence upon the values of *K*. The max. work ($A = 2.303\ RT \log K$) of formation of the anilides expressed in calories is as follows: Aniline, +1050; toluidines, *o*, +390, *m*, +1130, *p*, +1380; anisidine, *o*, +350, *p*, +1800; chloroanilines, *o*, —1460, *m*, +71, *p*, +580; bromoanilines, *o*, —1300, *m*, +140, *p*, +510; nitroanilines, *o*, —4300, *m*, —540, *p*, —2100; naphthylamine, *α*, —46, *β*, +760. There was found to be no connection between the values of *A* and the velocity of decomp. of the anilides. The temp. has very little influence upon the values of *K*. W. D. HARKINS.

A Possible General Relation between the Structure of Organic Compounds and their Equilibria. JAMES W. MCBAIN AND OLIVER C. M. DAVIS. Univ. Bristol. *Z. physik. Chem.*, 78, 369–73.—A comparison of the equil. consts. of the anilides, *K* (cf. preceding abstract) with the dissociation consts. of the corresponding amines (k_b), and with the reciprocals of the dissoc. consts. of the corresponding acids and also of the corresponding phenols ($1/k_a$) show that there is a remarkable parallelism in the effects of the substituting groups upon the consts. of these widely differing reactions, so that substituting groups influence the degree of formation of the anilides, the increase of basic properties in the amines, and the decrease of acidity of the acids and phenols to almost the same degree. This is shown by the following table:

Substituting group.	*K* at 100°.	Dissociation consts. at 25°. Amine $k_b \times 10^{10}$.	Benzoic acid $1/k_a \times 10^{-3}$.	Phenol $1/k_a \times 10^{8}$.
None	4.1	4.6	16.7	7.5
o-CH_3	1.7	3.3	18.3	
m-CH_3	4.6	6.0	19.4	
p-CH_3	6.4	20.0	19.4	
o-OCH_3	1.6	....	6.7 or 12.2	
p-OCH_3	12.0	14.0	31.2	
o-Cl	0.14	....	0.76	1.3
m-Cl	1.1	....	6.45	....
p-Cl	2.2	1.3	10.7	2.5
o-Br	0.17	....	0.69	
m-Br	1.2	....	7.3	
p-Br	2.0	1.0	....	
o-NO_2	0.003	0.001	0.162	
m-NO_2	0.048	0.04	2.89	
p-NO_2	0.06	0.01	2.52	0.014
α-Naphthaline deriv.	0.94	0.93	5.0	
β-Naphthaline deriv.	2.8	1.9	14 or 20	
o-Cl, *p*-NO_2			0.12	0.56
o-COOH		0.0138	0.83	
m-COOH		0.122	3.4	0.12
p-COOH		0.023	6.6	0.34
o-NH_2		3.1	94.0	

It is possible that this parallelism of effects may be found through the whole of organic chem. The fact that reactions of such a widely different nature are affected to the same degree by changes of structure, is of importance in the application of the mass law of electrolytic dissociation, since such a dissociation must have the same general nature as the reaction of a nonelectrolyte. If deviations from the mass law occur, these may be considered as due to a displacement of the equil. by the elec. forces involved. W. D. HARKINS.

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The Thermal Conductivity of Several Series of Alloys of Noble Metals. F. A. SCHULZE. *Physik. Z.*, 12, 1028–31; *Ber. physik. Ges.*, 1911, 856–60.—S. presents data for series of alloys of Pd with Ag, Pt, and Au and of Pt with Ag and Au, which were obtained by a modification of the Kohlrausch method. The relation of thermal cond. to elec. cond. proves to be fairly const. not only for the alloys of one series but also for all the series, thus confirming the Wiedemann-Franz law. L. H. ADAMS.

Reduction of Mercuric Chloride by Phosphorous Acid and the Law of Mass Action. J. B. GARNER. *Am. Chem. J.*, 46, 648.—States that an error in a recent article (*C. A.*, 6, 16) will be corrected. W. C. BRAY.

Kinetics of Ammonium Salts. HANS VON HALBAN. Chem. Inst., Univ. Würzburg. *Z. physik. Chem.*, 77, 719–34.—The division by Wedekind and Paschke of solvents into 2 groups of greater or less dissociating power according to their influence on the speed of decomp. of substituted NH_4 salts (*e. g.*, propylMebenzylPh-ammonium bromide) dissolved in them is inaccurate; instead the distinction should be based on the fact observed by H. that the rate of decomp. of such salts is small in solvents containing OH and greatest in solvents which do not contain OH. The decrease in the rate of change of rotation (observed polariscopically) when an optically inactive nitrate is added to the *d*-iodide of the same substituted NH_4 radical is due to the effect of the *dl*-nitrate and is not proportional to a retardation in the rate of decomp. of the iodide as W. and P. supposed; on the contrary, the retardation, as measured by titration of the iodide, is slight and may better be explained by the formation of mixed double mols. of the 2 salts. Practically no polymerization occurs in the solvent tetrachloroethane (in contradistinction to $CHCl_3$) as indicated by the constancy during the decomp. of the velocity "constants." Double decomp. takes place practically instantaneously between different substituted ammonium salts dissolved in $CHCl_3$ and in tetrachloroethane. The small temp. coeff., 1.02, observed by W. and P. and taken by them to be characteristic of the formation of substituted NH_4 salts by addition, is due to exptl. errors; the correct value is about 1.7. Cryst. compds. in mol. proportion between $CHCl_3$ (also $CHBr_3$) and substituted NH_4 salts (*e. g.*, benzyldiEtPh-ammonium iodide) were observed. H. S. PAINE.

An Experimental Investigation of Gibb's Thermodynamical Theory of Interfacial Concentration in the Case of an Air-Water Interface. F. G. DONNAN AND J. T. BARKER. Muspratt Lab., Univ. Liverpool. *Proc. Roy. Soc. London*, *A*, 85, 557–74.—If a soln., whose conc., c, is so small that the laws of dil. solns. hold, be sepd. from another phase in which the conc. of the solute is negligible, Gibb's equation for the capillary adsorption (the mass of solute per unit area of surface *in excess* of the uniform conc. of the soln.) may be written, $\Gamma = (c/iRT)d\sigma/dc$, where σ is the surface tension at the boundary, R, the gas const., and i, the van't Hoff factor. In an attempt to verify this equation, the authors have detd. by the use of the drop-number method the surface tensions of aq. solns. of various concs. of nonylic acid and saponin. From the plotted results $d\sigma/dc$ can be detd. The capillary absorption, Γ, was detd. in the following way: A large number of air bubbles were made to pass through a column of soln. in such a way that they rose and broke in a separate vessel. Thus the return to the soln. of the solute adsorbed in their surfaces was prevented. By suitable app. the number and size of the bubbles was measured and from this their total surface was calc. It was found that the total amt. of solute removed by adsorption could be most easily and accurately detd. by taking the drop-number of the soln. before and after the bubbling. The change in conc. was then detd. from the surface tension-conc. curve mentioned above. The amt. removed per unit of surface is Γ. The observed values are of the same order of magnitude as those calc. from the Gibb's equation by the use of the $d\sigma/dc$ measurements. R. H. JESSE, JR.

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The Quantitative Relations of the Partition of a Substance between Two Phases: Adsorption. R. KRULLA. *Z. physik. Chem.*, 76, 497–508.—If the partition of a substance between its liquid and gaseous phases is plotted with the use of the ds. of the vapor and the coexisting liquid as ordinates, and, as abscissas, the temp. (expressed as a fraction of the abs. critical temp.) multiplied by the ratio of one-half the vapor d. at abs. zero to the critical d., the curves for NH_3, SO_2, CO_2, N_2O may be superposed upon each other. By the substitution of x/y for the previous ordinates (y) the curve becomes an hyperbola, one branch of which approaches the asymptote so quickly at the critical point that it may be considered a straight line. The properties of these substances are not therefore a function of their d. but of the d. increased by a certain constant amt. The same sort of curves were found by the author to express the phenomena of adsorption in filter paper. The mutual solubilities of two liquid phases are treated in the same way. The curves here, however, do not show so close an agreement. Since the equation of the "straight line" can be calc. from 2 observed points, the calc. of the mutual solubilities of 2 liquid phases is possible. R. H. JESSE, JR.

The Heat of Fusion of Colloids. J. FRANK. Physik. Inst., Erlangen. *Ber. physik. Ges.*, 1911, 890–8.—The following app. is used to det. whether a colloidal substance has a heat of fusion. One junction of a thermocouple is suspended in the middle of a cylinder containing the subst. under investigation; the other junction is on the outside wall of the cylinder. The whole is immersed in a bath whose temp. is below the m. p. and is left until there is no galvanometer deflection. Now the whole is quickly transferred to a bath several degrees higher and above the m. p. From the mode of change of galvanometer deflections with the time, one can ascertain if there is, or is not, an appreciable heat of fusion. Rosin, mixtures of rosin and turpentine oil, and mixtures of gelatin and H_2O were investigated. It was found that none of these possessed a heat of fusion. R. H. JESSE, JR.

Reversible Light Reaction of Sulfur. A. WIGAND. Halle a/S. *Z. physik. Chem.*, 77, 423–71.—In both liquid and dissolved S, S_λ changes to S_μ on exposure to light. The reaction is reversible and leads to a true photochemical equil. The influence of the state of the S_μ on the reverse reaction $S_\mu \longrightarrow S_\lambda$, which occurs in absence of light, was studied. The production of colloidal S in light was established by means of the ultramicroscope. A method for fractionally pptg. the colloidal S_μ was worked out. The influence of conc., of S_λ, temp., stirring, cataphoresis, vol., illuminated surfaces, and solvent were studied. By the f. p. method, the displacement in liquid S of the "dark" equil. by illumination was confirmed as also the reversal in the dark to the original condition. The absorption of both visible and ultraviolet rays in soln. of S and liquid S was measured by means of the spectrometer and the spectroscope. The heat of soln. of cryst. S in CS_2 was found to be —12.5 g.-cal. and for sol. amorphous S —1.0 g.-cal. per g. The energy of transformation by light, of S_λ to S_μ in CS_2, CCl_4, C_6H_6 solns. was detd., and for CS_2 found —15.8 g.-cal. per g. S_μ. Between the specific influence of the solvent on the speed of the light reaction and the heat of soln. of S_λ in the same solvent, there exists a quantitative relation. The efficiency factor of the absorbed rays was calc. to be 0.24%. D. M. LICHTY.

Studies on Photohaloids. III. The Absorption of Dyes, Proteins and other Organic Compounds in Crystallized Silver Chloride. W. REINDERS. Delft. Anorg.-Chem. Lab. Techn. Hochschule. *Z. physik. Chem.*, 77, 677–99; *C. A.*, 5, 2223, 2372, 2373, 3380. H. S. PAINE.

Photochemical Studies. III. Propagation of a Light Reaction through a Medium. JOH. PLOTNIKOV. Univ. Moscow. *Z. physik. Chem.*, 78, 293–8.—The propagation of a light reaction through a light-absorbing medium in the absence of stirring, etc., can be nicely shown by using a glass tube closed at one end by a glass plate and con-

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taining a satd. soln. of cinnamic acid and a dil. soln. of Br in benzene (prepared in the dark). A beam of light (*e. g.*, from a Uviol lamp) of same diam. as the tube is allowed to strike the soln. in the direction of the axis of the tube, all other light being excluded. The propagation of the addition reaction between cinnamic acid and Br is indicated by the advance of a sharply defined colorless zone fron the end where the light is incident to the other end of the tube; the reaction between Br and C_6H_6 does not interfere. The reaction velocity is independent, within wide limits, of the conc., but is proportional to the speed of propagation of the colorless zone which in turn can be placed equal to kmA, where A represents the absorbed light, m is the chem. efficiency for the corresponding wave length, and k is a characteristic constant which is detd. by the properties of the medium. H. S. PAINE.

The Conditions of the Production of the Spectrum of Swan and Possible Conclusions Relative to Comets which Give that Spectrum. J. MEUNIER. *Compt. rend.*, 153, 863–5.—Continuing his study of the Bunsen flame M. shows that the Swan spectrum given by the sheath of the inner cone is due to an explosive combustion, and that the presence of O is necessary in the gas mixt. This would lead to the conclusion that O is present in comets which give the Swan spectrum. J. HUNT WILSON.

The Optical Temperature Coefficients of Rock-salt, Sylvite and Fluorite. ERICK LIEBREICH. *Ber. physik. Ges.*, 1911, 700–12; cf. *C. A.*, 5, 2354.—The decrease with rizing temp. of the refractive index of the substances in the order named is greatest for wave lengths 1–1.2μ, 2–3μ, 0.8–0.9μ, where it amounts to 0.000032, 0.000029, 0.000012 per deg. H. E. MERWIN.

Fluorescence of Vapors of Alkali Metals. L. DUNOYER. *Compt. rend.*, 153, 333–6.—The channeled spectrum of Na appears at 290°, but the *D* lines under certain conditions as low as 210°. If impure Na is used the fluorescence is green, if pure it is clear yellow. The purple fluorescence of K begins at 215°, increases rapidly and becomes very brilliant at 320°. The reddish purple of Rb appears at 180°. Cs exhibits a fugitive fluorescence at 320°. The spectrum of the Rb fluorescence consists at 200–300° of a red unsymmetrical band 705–656. With the app. used this band appeared to be unchanneled. At 350° appears a band in the orange 630–590 $\mu\mu$ which increases rapidly with temp. and becomes displaced toward the higher wave lengths. The fluorescent spectrum of Rb excited by white light is composed of two bands, one corresponding to an absorption band and the other appearing at higher temp. without relation to any absorption. R. F. JACKSON.

Note on the Iridescent Colors of Birds and Insects. A. MALLOCK. *Proc. Roy. Soc. London*, (*A*) 85, 598–605.—Reasons are given for the author's belief that these colors are the result of light interference and that they are not due to selective reflection. R. H. JESSE, JR.

The Magnetization of Salts of the Iron Group. R. H. WEBER. *Ann. Physik*, 36, 624–47.—W. gives the results obtained by continuing his work on the salts of the Fe group (*Ann. Physik*, 19, 1056; *Sitzb. u. Abh. d. naturw. Ges. zu Rostock*, 3, 1911). —His former observation that the salt formed by the action of HCl on MnO_2 has the same coeff. of magnetization as $MnPO_4$, has been confirmed by chem. investigations which show that the compd. is $MnCl_2$. According to Weiss the mol. magnetic moment of a mol. is, for the cases investigated by him, an integral multiple ($= n$) of a normal value (1123.5 c. g. s.), and he concludes that this is the value of a g. magneton, and that every mol. contains an integral no. of magnetons. The following table gives the values of n for the salts investigated, the value for the last 5 being deduced from measurements by Liebknecht and Wills: $CrCl_2$, 19.05; $CrCl_2$, 24.95; $MnPO_4$, 25.01; $MnSO_4$, 29.54; $^1/_2Fe_2(SO_4)_3$, 29.58; $FeSO_4$, 27.10; $^1/_2\ Co_2(SO_4)_3$, 16.82; $CoSO_4$, 24.26; $NiSO_4$, 15.9. W. D. HARKINS.

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The Hall Phenomenon and the Transverse Thermomagnetic Effect in Graphite. EDMOND VAN AUBEL. *Compt. rend.*, 153, 331–3.—Measurements of the Hall effect showed that with graphite it is of opposit sign, and about 5–10 times the intensity, as compared with Sb. Graphite thus behaves in this respect like the other varieties of C; in the series of coeffs. of the Hall effect it comes immediately after Bi.

G. R. FONDA.

The Hall Effect and the Transverse Thermomagnetic Effect in Graphite. E. VAN AUBEL. *Compt. rend.*, 153, 568–9.—A relation has been shown to exist between the Hall effect and the thermoelectric power, to which Co and constantan are exceptions. Graphite, whose Hall effect lies near that of Bi, was found to give, against Cu, above 18 microvolts per deg., which corresponds to a much smaller Hall effect. The transverse thermomagnetic effect is about 3 times that of Sb, and in the same direction.

W. P. WHITE.

Reaction Catalyzed by Nickel (VAN BERESTEYN). 10. Thermochemical Investigations (IV) (AUWERS). 10. Influence of Constitution on Molecular Volume (LE BAS). 10.

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4. ELECTROCHEMISTRY.

C. G. FINK.

Electrical Growth in 1911. EDIT. *Elec. World*, 59, 4–25; *Elec. Rev. West. Elec.*, 60, 7–13. C. G. F.

Electrical Progress in Great Britain during 1911. A. H. BRIDGE. *Elec. Rev. West. Elec.*, 60, 14–5. C. G. F.

The Year's Electrical Developments in Continental Europe. *Elec. Rev. West. Elec.*, 60, 15.—Prof. Urbain of the Paris Univ. has a new arc lamp with a W anode and a Hg cathode spaced $^{3}/_{16}$ in. apart and enclosed in a vacuum or inert gas. The efficiency is said to be 0.45 w. p. c. W. L. VAN KEUREN.

The World's Electric Iron and Steel Furnaces. *Mining Eng. World*, Aug. 26, 1911; *J. Soc. Chem. Ind.*, 30, 1121. E. J. C.

The Comparative Values of Water Power and Steam Power. A. C. DUNHAM. *Elec. World*, 59, 39.—On the whole, in any new installation, designed to develop elec. energy, steam-power can be employed, with much greater chances of profit, than almost any water-power in any part of the U. S. except where the price of coal is abnormally high. W. L. V. K.

The Roosevelt Dam and Power Plant. ANON. *Elec. Rev. West. Elec.*, 59, 1319–29.—A detailed description. L. K. MULLER.

Electric Energy from Cohesive Forces. CARL HERING. *Met. Chem. Eng.*, 10, 14.—In some recent electrolytic tests in which the metal was dissolved from solid anodes and deposited on the cathode in a loose, finely divided form, the voltage required was considerably greater than the calc. amt. Conditions were otherwise normal so the only reason for this increase was the fine subdividing of the metal during the process of electrolysis. Apparently some energy is necessary to overcome the forces of cohesion of the mol. If this argument is correct, it might follow conversely that if the anode were made of finely divided metal, *e. g.*, a pptd. metal, and the cathode deposit were in a dense form, like ordinary metal, a direct e. m. f. would be formed. Hence such an electrolytic cell when short-circuited might possibly generate its own

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current. If so, it would be a case of producing elec. energy by the cohesive forces of matter. G. F. YESSLER.

Graphic Method for Determining Potential Drop in Transmission Lines. N. FORTSBLAD. *Elektrotechn. Z.*, 32, 1185. C. G. F.

Electric Laboratory Furnaces with Wire Resistors of a Base Metal. L. UBBELOHDE. *Z. Elektrochem.*, 17, 1002.—In earlier attempts to use Ni windings as the resistor for elec. furnaces, the structure of the metal was altered or it was rapidly oxidized by the air, even in spite of protective coatings of clay or asbestos. In the present successful furnace the windings are imbedded in C and thus protected from oxidation. Such an arrangement is suitable for all types of wire wound furnaces. During the heating of the furnace a small part of the C burns to a mixt. of CO and CO_2. A small loss of C packing will be noted after 30 or 40 furnace heats. Accordingly fresh packing can be added from time to time through an opening in the furnace case. The wiring is protected by a paste made of kaolin, clay and short asbestos fibers, which is both porous and highly infusible. The common metals effect a far more economical use of the elec. current than does Pt. Pt has 5 times the resistance at 1000°, as at 20°. Accordingly with a Pt wound furnace a large part of the elec. energy is wasted in passing through auxiliary resistance in order to regulate the current. With the new furnace, the resistance at 1000° is only a trifle greater than at 20°. Accordingly a furnace can be started by putting it in directly across the line without external resistances. Diagrams are given for the comparative performances of a Pt wound furnace and one of the new type. In the former a temp. of 1200° was obtained after about 30 min., in the latter in 16 min. The current consumption of the Pt wound furnace is almost 4 times as great as in the case of this new furnace in bringing each furnace up to heat. The Pt wound furnace takes about double the current of this new furnace in maintaining the high furnace heats. The new type of furnace is cheap to construct and maintain. H. M. FERNBERGER.

Direct Production of Steel from Minerals by Means of the Electric Furnace. REMO CATANI. *Rass. min.*, 35, 211–3, 258–61, 276–9.—Address. CHAS. A. ROUILLER.

The Applications of Electricity in the Metallurgical Industry of Italy. R. CATANI. *Electrician*, 68, 429; *Elec. Rev. West. Elec.*, 59, 893; *Met. Chem. Eng.*, 9, 642–9.—Stassano, Héroult and Girod furnaces are now being used in various parts of Italy. Expts. on the smelting of pig Fe in the elec. furnace were carried out by Carcano on the pyrites residues, often exceeding 4% S, which abound in that country. The type of furnace used and power consumption per ton of Fe are given but not sufficient data to judge the economic aspect of the process. Italy also manufs. ferro-alloys, ferrosilicon being the most important. The elec. furnace used is identical with that used for the production of CaC_2, and works with the same current at the same pressure. The greater part of the ferrosilicon manufd. is produced from quartz and scrap Fe. Carcano has made a kind of spiegel and silico-spiegel using pyrites residues. G. F. YESSLER.

Electric Smelting and Reduction of Iron Ore in England. J. HARDÈN. *Electrician*, 68, 467. C. G. F.

Electric Steel and its Production. W. RODENHAUSER. *Z. angew. Chem.*, 24, 2289–2302.—Description is given of the various types of furnace now used for steel production, illustrated with cuts and diagrams together with an account of what has been accomplished by elec. furnaces. W. E. RUDER.

Process for Melting Quartz. O. VOGEL. *Elektrochem. Z.*, 18, 121, 218.—A description of an elec. furnace process for obtaining crystal clear quartz. The quartz

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is heated to full fluidity by the current being passed directly through the heated charge.
W. E. RUDER.

Electrolytic Nickel Smelting in Norway. ANON. *Brass World*, 7, 429.—Norway possesses extensive deposits of Ni ores, containing as high as 2% Ni. The present annual production is about 70 tons Ni. The Ni ore is smelted into mat, which contains 40% Ni, and 25% Cu, and this mat is refined electrolytically at Christianssand. The mat is used as anode in a weak acid bath and Cu is first recovered. The electrolyte is purified with H_2S, then the Fe pptd. and the Ni deposited electrolytically with insoluble anodes.
ROBERT KANN.

The Future, Present and Past of Electroplating. C. H. PROCTOR. *Metal Ind.*, 10, 9–10.
E. J. C.

A New Electroplating Process. ANON. *Electrician*, 68, 334.—The nonconducting surface of the article is roughened by a sand blast and painted with a paste consisting of a mixt. of the chloride, or other salt, of the metal to be deposited and HF, and the metal deposited from an electrolytic bath by the usual means. This arrangement also makes the cold galvanizing of such articles as screws, chains, etc., possible at a much lower cost than the present hot process. The process is being developed by the Harvey Electro-Chem. Co., London.
C. N. MOORE.

New Type of Electroplating Dynamo. ANON. *Elec. Rev. West. Elec.*, 59, 1351.—An illustrated account of the new multipolar dynamos of the Munning Loeb Co.
L. K. MULLER.

"Trisalytes" the New Salts for the Electrodeposition of Metals. ANON. *Brass World*, 7, 438–40.—These compounds are triple salts of the metal to be plated and have just been introduced to the trade. The advantage claimed is that they can be made of uniform quality, and that they are free from chlorides which are often objectionable in a plating bath.
ROBERT KANN.

The Cause and Prevention of Pitted and Rough Nickel Deposits. E. BLASSETT, JR. *Metal Ind.*, 9, 462.—The pitting of Ni deposits is due to the occluded H forming minute blisters within the deposit or the H bubbles may remain attached to the work while the metal deposits around them. Pitting occurs when the soln. is low in metal and the current is depositing H in a greater proportion than when the soln. has the required metallic content. Cl is sometimes introduced at the cathode to prevent the deposit of H. Another method employed to remove the H from deposited Ni is to place the plated article in a muffle furnace and introduce a current of H. A red heat is employed and in this manner all the H is expelled, rendering the deposit more soft and pliable and less liable to part from the plated surface. Articles should also be kept in motion while being plated, thus allowing the use of a greater c. d. and minimizing the occlusion of H.
W. E. RUDER.

Manufacture of Carbon Electrodes for Galvanic Cells. O. BRANDT. *Elektrotechn. Z.*, 32, 1183–5.—Retort C is usually used as raw material. In the improved 'Bunsen' there are 2 prepared carbons, one a mixt. of 1 part powdered anthracite coal and 2 parts powdered coke pressed in a sheet iron form, sintered, impregnated with sirup and fired in absence of air, and the other, a mixt. of graphite and coal tar treated in a similar manner. In the Leclanché there is used a mixt. of 52 parts coal or retort C, 40 parts MnO_2, 5 parts shellac and 3 parts K_2SO_4, submitted to a pressure of 250–300 atms. at 100°. Illustrations of the various types of electrodes are given. A multiple electrode (*Germ. Pat.* 168854), consisting of a series of interconnected C rods surrounded by a depolarizing substance suitable for obtaining a high capacity in a small space is described.
C. N. MOORE.

The Manufacture and Performance of the Edison Storage Battery. HOWARD

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LYON. *J. Ind. Eng. Chem.*, 3, 922–9.—The evolution of the Edison storage battery is traced and a comparison made with the Pb battery, The construction of the Edison cell is described in detail with emphasis laid upon its simplicity and lack of care required in operation. Curves are presented showing action of battery under rough treatment especially destructive to batteries of the Pb type. Curves showing action of Edison battery under normal and abnormal conditions are also given. Apparently the Edison storage battery improves with abuse. C. H. ELDRIDGE.

Increase of Resistance of Coils with Alternating Current. KARL HERRMANN. Reichsanstalt, Charlottenburg. *Ber. physik. Ges.*, 1911, 978–83.—Measurements of the ratio of resistance of 2 coils, one of solid wire the other of braided wire, when currents of very high frequency were passing through them, confirm the conclusions of Lindemann in regard to this question (*Ber. physik. Ges.*, 1909, 28); *i. e.*, at high frequencies, braided wires do not have the same relative advantages as at low frequencies. L. H. ADAMS.

A Chemical Theory of Galvanic Cells of the Daniell Type. P. PFEIFFER. *Z. Elektrochem.*, 17, 990.—The theory is based on Werner's coördination theory of electrolytic dissociation of which a résumé is given. The parallel existing between heat of oxidation of metals and their potential differences is not explained by the Nernst theory of the production of e. m. f. According to P. the origin of e. m. f. in a Daniell cell is due to definit oxidation and reduction processes. He assumes that metals can be oxidized by OH′ ion. In aq. solns. of metallic salts there are present numerous OH′ ions *e. g.*, $ClH.OH' = ClH_2O$, $NO_3H.OH' = NO_3H_2O$, in general A.OH′. Metals acting on these ions produce hydroxides or aquo salts A.OHMe, and the negative electrons previously joined to the OH group are set free, Me + A.OH′ ⟶ A.OH-Me + (⊖). The group A.OHMe then establishes equil. with the formation of metal hydrate ions $MeOH.H = MeOH_2$ (see Werner theory). The stronger the affinity of the metal for O, the greater the e. m. f. of the metal-metallic salt combination. Since the reaction is reversible the free energy of the oxidation process is transformed completely into elec. energy. Affinity for O thus dets. soln. of metals and connection between heat of oxidation and potential differences of metals is explained. Similarly, electromotive activity of halogens with affinity for H corresponds to a reduction process, MeOH.H′ + X ⟶ MeOH.HX + (⊕) and + elec. is set free. A parallel between electromotive activity of halogens and their heat of reduction exists. The sepn. of metals and metalloids from the aq. soln. of their ions follows conversely from the above explanation: A.OHMe + (⊖) ⟶ A.OH′ + Me and MeOH.HX + (⊕) ⟶ MeOH.H′ + X. The foregoing views are shown to be in agreement with the Nernst formula $(E = RT/n)\ ln\left(\frac{P}{p}\right)$ and with the electro-affinity theory of Abegg and Bodländer. J. S. GOLDBAUM.

Measurement of Electric Energy by Electrolytic Meters. J. B. BAKER. *Elec. Rev. West. Elec.*, 59, 1023, 1275.—The operation of electrolytic meters is based on the same principle as the voltameter. The Edison meter consists of an electrolytic cell in which a definit shunted portion of the current is made to deposit Zn upon a Zn cathode. The quantity of electricity is computed from the increase in wt. of the cathode. The Bastian meter differs from the Edison meter in giving direct readings on a scale, the product of electrolysis being a gas which displaces the electrolyte. It consists of a graduated glass tube of electrolyte with a bulb at the bottom containing Ni electrodes. The passage of current causes decomp. of the electrolyte; the evolution of gas (O and H) is evidenced by a lowering of the level of the electrolyte on the scale. A fixed quantity of NaOH is added to reduce the voltage drop through the meter and to prevent risk of freezing. Evapn. is prevented by a little oil on the top

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of the column of electrolyte, and the escape of moisture with the evolved gas is prevented by a Pb cap resting by its own wt. on the ground top of the tube. The counter e. m. f. of the electrolytic cell is about 1.7 v., and the total av. drop due to resistance and the back e. m. f. is kept within 2.0 v. by the low resistance of the soln. and the ample size of the electrodes. The meter is constructed for use on 110, 220 and 500 v. circuits. G. F. YESSLER.

The Mercury Arc. R. A. HOUSTOUN. *Electrician*, 68, 397.—A review. L. K. MULLER.

Are Incandescent Lamps Free from Self-induction? M. HOCHSTADTER. *Electrician*, 68, 380.—The effect was noticed through the use of an especially sensitive wattmeter. When attempts were made to use C lamps as resistances, they always appeared to give errors but in the same direction. These errors disappeared with the other type of resistances. C lamps for 110 and 220 v. suspended from insulators, showed an error similar to that caused by self-induction and the amt. of which depended on the voltage applied to the sep. lamps. The errors in readings were similar to those observed in the arc and called hysteresis. The variable resistance of the C filament taken in conjunction with thermal sluggishness, produces this same effect during every increase or decrease of the a. c. passing through it. H. deduces a formula for detg. this effect: $\mathfrak{F} = {}^1/_2 \sin a$ where $\mathfrak{F}$ is the error in angle of phase displacement. H. M. FERNBERGER.

Transformer Oils (BERNINGER). 22. Temperature or Pressure Recorder. 1. A Resistance Thermometer (DECKERT). 1. Electro-analytical Determinations (BAUMANN). 1. Electrolytic Reduction of Nitrobenzene (SNOWDON). 10.

U. S., 1,013,189, Jan. 2. F. LOUVRIER. **Electric furnace.**

U. S., 1,013,359, Jan. 2. M. APPEL. **Electric resistance furnace.**

U. S., 1,013,416, Jan. 2. C. F. MASSEY. **Molding battery wells.**

U. S., 1,013,445, Jan. 2. H. RODMAN. **Making storage battery electrodes.**

U. S., 1,013,572, Jan. 2. R. W. SUMAN. **Shaping tungsten filaments.**

U. S., 1,013,599, Jan. 2. D. HAND. **Making metallized carbon filaments.**

U. S., 1,013,700 and 1,013,701, Jan. 2. F. J. TONE. **Making dense silicon carbide.**

U. S., 1,014,151, Jan. 9. W. T. HOOFNAGLE. **Apparatus for the electrical treatment of vapors or gases.**

U. S., 1,014,199, Jan. 9. E. G. ACHESON. **Tough refractory compound containing silicon and carbon.**

U. S., 1,014,560, Jan. 9. E. BECKER and O. BECKER. **Electroplating aluminium and its alloys.**

U. S., 1,014,882, Jan. 16. H. T. JONES. **Making a resistance material from graphite and other carbonaceous substances of greater conductivity.**

Ger., 230,734, Dec. 9. 1909. W. C. HERAEUS. In the production of **iridium cathodes** which do not amalgamate in Hg salt solns., the Ir sheet is subjected to an oxidizing treatment.

Ger., 231,079, June 20, 1909. J. S. TURNER and A. W. MAXWELL. In the **bleaching of bamboo and like raw material,** first soaking in a salt soln. contg. free O to which H_2SO_4 or other acid is added, then washing and introducing into a weak alk. soln., the actual bleaching being then effected by employing 2 parallel electrodes of **great** surface between which passes the salt soln. or acid to be treated by the elec. current.

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Ger., 231,378, Aug. 16, 1908. C. GRUNWALD. **Fusion gutter for electric induction furnaces.** The fusion hearth is provided in the center with a recess. One leg of an Fe yoke is passed through this recess, and around this leg a wire coil to which the primary current is fed is wound. The gutter for the charge is provided on the hearth which is vaulted over. A tap hole is provided.

Ger., 232,074, July 9, 1905. SOC. ANON. ELECTROMÉTALLURGIE PROCÉDÉS P. GIROD. **In electric furnaces,** protecting the electrodes sunk in the walls from attacks of the liquid metal covering the same during operation.

6. INORGANIC CHEMISTRY.

H. I. SCHLESINGER.

Experimental Inorganic Chemistry. F. SOMMER. *Fortschritte Chem.*, 4, 381–93.—Review for the period Jan.-June, 1911. J. J.

Heats of Solution of the Monohydrate and Dihydrate of Lithium Chloride. A. YA. BOGORODSKII. Imp. Univ., Kazan. *J. Russ. Phys. Chem. Soc.*, 43, 1268–74.—Calorimetric detns. of their heats of soln. (*S*), with a Dewar flask as calorimeter, gave for $LiCl.H_2O$ 4195 cal. at 22.9° and 4121 cal. at 20.3°, which gives for the temp. coeff. 29.02 cal., and for $LiCl.2H_2O$ 938 cal. at 18.7° and 981 cal. at 22.2°, which gives for the temp. coeff. 12.3 cal. The fact that *S* for $LiCl.2H_2O$ is positive indicates the existence of a still higher hydrate. A compd., $LiCl.3H_2O$, was prepared by the author (*Ibid.*, 26, 209), but owing to its low transformation temp. (—15°) its *S* was not detd. From general considerations its *S* ought to be about —1040 cal. According to Thomsen negative *S* of halides indicates absence of higher hydrates. The author shows that this cannot have general significance, since the *S* of NaBr and Na_2HPO_4 and of their hydrates $NaBr.2H_2O$ and $Na_2HPO_4.7H_2O$ are negative, and nevertheless there are the hydrates $NaBr.5H_2O$ and $Na_2HPO_4.12H_2O$. Thomsen's rule may hold good when the negative *S* is large; when it is small there may be a higher hydrate, but its positive heat of hydration is masked by the large negative *S*. H. M. GORDIN.

Reduction of Neutral Solutions of Potassium Permanganate in Presence of Neutral Sulfates in Different Concentrations. P. CHEISHVILI. Khar'kov. *J. Russ. Phys. Chem. Soc.*, 43, 1402–20.—A 0.1 *N* soln. of $KMnO_4$, from which all suspended matter was removed by filtration through asbestos, was mixed with varying amts. of solns. of different neutral sulfates, and the titer detd. with $FeSO_4$ after intervals of 24 hrs. to one year, keeping the mixts. exposed to the light. The results show that most salts have either an accelerating or retarding catalytic effect on neutral $KMnO_4$ solns., and that the effect varies with the length of time of the reaction, the conc. of the salts, and various physical conditions of the expts. A set of expts. made in Russia did not well agree with another set made in Switzerland, owing to differences in the conditions prevailing in the 2 labs. H. M. GORDIN.

Uranyl Salts. I and II. Hydrates of Uranyl Nitrate. A. M. VASIL'EV. *J. Russ. Phys. Chem. Soc.*, 42, 570–81.—$UO_2(NO_3)_2.6H_2O$ loses H_2O in the desiccator changing to $UO_2(NO_3)_2.2H_2O$. Contrary to Zimmermann's statement (*Ann.*, 232, 273) U_3O_8 produced by calcining the hydrates of $UO_2(NO_3)_2$ hardly loses any O even upon prolonged calcination. At 100° $UO_2(NO_3)_2.6H_2O$ loses H_2O very slowly, the loss after 2 weeks amounting to 4–4.5 mols. H_2O; at the same time there is a loss of HNO_3 at this temp. $UO_2(NO_3)_2.6H_2O$ m. 60.2° (Ordney, 59.5°; *Am. J. Sci. Arts*, [2] 26, 208) changing to $UO_2(NO_3)_2.3H_2O$ which seps. out, but redissolves at 75°. On further heating the molten salt loses HNO_3 leaving a basic salt (to be examd. later) completely sol. in H_2O with a yellow color, but without fluorescence. If $UO_2(NO_3)_2.6H_2O$ be

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kept for some time at a little above its m. p., it changes to $UO_2(NO_3)_2.2H_2O$. $UO_2(NO_3)_2.3H_2O$ can be obtained in monoclinic crystals by recrystn. of $UO_2(NO_3)_2.6H_2O$ from HNO_3 (1.4) in a desiccator; some of the crystals resemble gypsum; it m. 121.5° changing to $UO_2(NO_3)_2.2H_2O$. The latter can be obtained in thick fluorescent green rhombs by recrystn. of $UO_2(NO_3)_2.3H_2O$ from HNO_3 (1.502); it m. 179.3° without decomp. $UO_2(NO_3)_2.1.5H_2O$ does not exist. The cryohydrate of $UO_2(NO_3)_2$ is formed at —18.1° and contains 54.9% $UO_2(NO_3)_2.6H_2O$ corresponding to $UO_2(NO_3)_2.28.93H_2O$. The % solubility of $UO_2(NO_3)_2.6H_2O$ at various temps., calc. for the anhydrous salt (represented by a curve) is as follows, these values being followed by the number of mols. H_2O for 1 mol. $UO_2(NO_3)_2$: —18.1°, 43.12, 28.93; —12.1°, 45.53, 26.20; —2.2°, 48.77, 23.01; 0°, 49.46, 22.38; 5.5°, 50.55, 21.42; 12.3°, 52.88, 19.52; 21.1°, 55.98, 17.23; 25.6°, 57.17, 16.41; 36.7°, 61.27, 13.85; 45.2°, 65.12, 11.73; 51.8°, 67.76, 10.67. By extrapolation of this table we find in accord with the above statement that the comp. of the satd. soln. at 75° would correspond to $UO_2(NO_3)_2.6H_2O$. The following table gives the concs., calc. for $UO_2(NO_3)_2$, of dil. solns. of $UO_2(NO_3)_2.6H_2O$, the temps. at which ice seps. out on cooling and the number (n) of mols. of H_2O in the soln. for 1 mol. $UO_2(NO_3)_2$:

Temp.....	—1.6°	—2.1°	—2.9°	—4.4°	—6°	—7.9°	—11.2°	—18.1°
% $UO_2(NO_3)_2$.....	10.83	12.24	17.19	23.52	26.20	32.53	37.09	43.12
H_2O (n).....	180.34	157.05	105.52	71.22	61.70	45.43	37.15	28.93

This table can be used as material for detg. the variations in the degree of dissociation of electrolytes. For detg. the mol. wt. of an electrolyte by the method of the lowering of the f. p. we have the well known formula: $M_1 = KGi/LT$, in which M_1 is the mol. wt. and G the wt. taken of the solute, K a const. depending on the nature of the solvent, L the wt. of the solvent, T the number of degrees by which the f. p. is lowered, and i the number of ions produced by the dissociation of 1 mol. of the solute. If 1 mol. of the solute whose mol. wt. is M_1 is dissolved in n mols. of a solvent whose mol. wt. is M, we have $G = M_1$ and $L = nM$. Since for H_2O as solvent $M = 18.02$ and $K = 1850$, we can substitute these values of G, L and K into the above equation and get $i = 18.02nT/1850$ (I). Taking the values of T and n from above table, we can calculate from (I) the variations in i with diln. The values of n are represented by a curve and those of i given in table (C) in which the values of i_0 are also given, i_0 being the values obtained by using only that amt. of H_2O which corresponds to $UO_2(NO_3)_2.6H_2O$ instead of $UO_2(NO_3)_2$, *i. e.*, using in (I) n_0 for n such that $n_0 = n$—6

T.....	1.6	2.1	2.9	4.4	6.0	7.9	11.2	18.1
n.....	180.34	157.05	105.52	71.22	61.70	45.43	37.15	28.93
i.....	2.81	3.21	2.98	3.05	3.69	3.50	4.05	5.10
i_0	2.72	3.09	2.80	2.80	3.25	3.03	3.40	4.04

A comparison of the values of n given in this table with its values calc. from its curve by interpolation shows that some of the table values are not quite correct, indicating slight errors in the experimental detns. of H_2O. Correcting these errors we get for i the following ascending series: 2.81, 2.83, 2.86, 2.92, 2.98, 3, 3.05, 3.33, 3.5, 4.05, 4.68, 5.1. Since in dil. solns. a slight error in the detn. of the % of H_2O recalc. for the mol. comp. of the soln. may amount to several mols. of H_2O and thus cause an irregular variation in i, a computation of i can be used as a control for the exactness of experimental data. It will be noted that $UO_2(NO_3)_2$ is one of those salts in the solns. of which i increases with conc. H. M. Gordin.

A Note on the Action of Oxygen on Iron under Conditions of High Temperature and Pressure. J. Milbauer. *Chemické Listy*, **5**, 298–9.—There was no change in wt. of the Fe, indicating that substances under absolutely dry conditions do not react. P. J. Hanzlik.

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Colloidal Gold. A. GUTBIER. Erlangen. *Z. Chem. Ind. Kolloide*, **9**, 175–89; cf. *C. A.*, **3**, 1502.—Colloidal Au, prepared by reduction of 150 cc. H_2O, and 5 cc. $AuCl_3$ (1 : 1000) by 10 drops of hydrazine hydrate (1 : 2000) is blue if the Au is reduced at room temps., but is red and stable to dialysis, b. and evapn. to a certain extent, when reduced at temps. between 80 and 100°. A few drops of 0.1 *N* electrolyte soln. changes the color to blue and finally causes pptn. of blue, insol. Au. Shaking with charcoal or $BaSO_4$ destroys the colloid. If the hydrazine hydrate is added to the hot water, then $AuCl_3$, the colloidal Au is in most cases not so stable as when the order is reversed. At room temp. the color of the colloidal Au is always blue, whatever the conc. of the $AuCl_3$ and hydrazine solns., at b. temp. the more dil. the solns. the greater the tendency to form red sols. Violet sols result when $AuCl_3$(10 cc.) 3 : 10000 is mixed with N_2H_4 1 : 500 (1 cc.); if the concs. are less the colloidal soln. is red-violet or red. The article contains extensive tables showing the effect of conc. of reagents, and temp. on the color of the colloid obtained. H. ISHAM.

Preparation of Stannic Iodide and its Solubility in Certain Organic Solvents. F. A. MCDERMOTT. Hygienic Lab., Washington. *J. Am. Chem. Soc.*, **33**, 1963–5.—CCl_4 is a better medium than CS_2 for preparing SnI_4 by the method of Schneider (*Pogg. Ann.*, **127**, 624 (1886)). The solubility of SnI_4 in CCl_4 at 22.4° and at 50.0°, in $CHCl_3$ at 28° and in C_6H_6 at 20.2° was detd. SnI_4 is fairly stable in air. $SnBr_4$ may be similarly prepared. A. R. MIDDLETON.

Lecture Table Experiment on Nascent Hydrogen. G. S. FORBES. *J. Am. Chem. Soc.*, **33**, 1965–6.—Into dil. H_2SO_4 (15 cc. conc. acid per l.) in a large Erlenmeyer flask, Mg ribbon is first introduced, then enough of a dil. soln. of $FeCl_3$ and $K_3Fe(CN)_6$ to impart a decided color. After brief shaking the soln. is filled with deep blue ppt. It is then shown that the several reagents separately do not produce a similar effect. A. R. MIDDLETON.

Behavior of the Hydronitrogens and their Derivatives in Liquid Ammonia. I. Ammonolysis of Hydrazine Sulfate. A. W. BROWNE AND T. W. B. WELSH. Cornell Univ. *J. Am. Chem. Soc.*, **33**, 1728–34.—At −33° the salt is decomposed according to the equation: $N_2H_4.H_2SO_4 + 2NH_3 = (NH_4)_2SO_4 + N_2H_4$. The soln. of N_2H_4 in NH_3 is readily sepd. from the $(NH_4)_2SO_4$ which is entirely insol. **II. Ammonolysis of Certain Hydrazine Salts.** A. W. BROWNE AND A. E. HOULEHAN. *Ibid.*, 1734–42.—$(N_2H_4)_2.H_2SO_4$, $N_2H_4.H_2C_2O_4$ and $N_2H_4.H_2SeO_4$ are ammonolyzed like the disulfate. $N_2H_4.H_3PO_4$ and $N_2H_4.2H_3PO_4$ are not decomposed. $(N_2H_4)_2.H_2SO_4$ is partially decomposed by NH_3 gas at room temp. and a liquid consisting essentially of a soln. of $(N_2H_4)_2.H_2SO_4$ in free N_2H_4, may be sepd. from the mixt. by centrifugal action. **III. Action of Ammonium Trinitride upon Certain Metals.** A. W. BROWNE AND A. E. HOULEHAN. *Ibid.*, 1742–52.—Li, Na, K, Ca and Mg react vigorously with a soln. of NH_4N_3 in liquid NH_3; Al and Sn do not react; Zn very slowly, only when in contact with Pt. A modified Schiff nitrometer is described in which (*a*) weighed amts. of 2 solids may be brought together in absence of air and moisture, (*b*) the evolved gases may be collected and measured, (*c*) the residual solid may be weighed and preserved. A. R. MIDDLETON.

Oxidation of Arsenious and Antimonious Oxides. J. BISHOP TINGLE. McMaster Univ. *J. Am. Chem. Soc.*, **33**, 1762–3.—These oxides are oxidized by air more readily than was to be expected from the literature. 0.5 g. As_2O_3 was completely oxidized when boiled 26.5 hrs. with 3 cc. 95% EtOH and 5 cc. H_2O. A. R. MIDDLETON.

The Asymmetric Cobalt Atom. III. A. WERNER. *Ber.*, **44**, 3272–8.—By the methods previously described (*C. A.*, **5**, 3770; **6**, 46) [1-Cl, 2-O_2NCo *en*$_2$] salts were split into optical isomers. The relatively great activity of the intra-radical Cl, on

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account of which the reaction, [1-Cl, 2-O_2NCo *en*$_2$]Cl + H_2O = [1-H_2O, 2-O_2NCo *en*$_2$]-Cl_2, proceeds rapidly in soln., caused much loss of material when Ag *d*-camphorsulfonate and *d*-bromocamphorsulfonate were used. This was overcome by using instead the NH_4 salts, by which surprizingly rapid sepns. were effected. In consequence of the above reaction the active salts show mutarotation accompanied by change of color from red to yellow. $[\alpha]_D$ original = 20°; final = 52°. After a week's standing the solns. were completely racemized. Without loss of activity the active chlorides were transformed by $NaNO_2$ and $HClO_4$ into *1,2-dinitroperchlorates*; $[\alpha]_D$ = +39° and —40°. The *l*-1-Cl, 2-O_2N chloride with KSCN gave *l-1-chloro-2-isothiocyanato chloride*; $[\alpha]_D$ = —84°. The *l-1-chloro-2-nitro nitrate*, $[\alpha]_D$ = —36.5° was also prepared. **IV.** *Ibid.*, 3279–84.—The 1,2-dichlorodiethylenediamino cobaltic salts, [Cl_2Co *en*$_2$]*X*, contain the radical [A_2Co *en*$_2$] and should possess asymmetry I and accordingly exhibit optical isomerism. An improved method for preparing large amts. of the *dl*-dichlorochloride is described. From this the optical isomers were isolated by means of the NH_4 salts of *d*-bromo- and *l*-bromocamphorsulfonic acids. The Ag salts could not be used on account of the readiness with which the intra-radical Cl is replaced by H_2O. The *d*-bromocamphorsulfonate of the *l*-complex and the *l*-bromocamphorsulfonate of the *d*-complex are difficultly sol. The following new salts of the complex [1,2-Cl_2Co *en*$_2$] were prepared: *l*-Complex *d*-bromocamphorsulfonate, $[\alpha]_D$ = —74°; *d-complex l-bromocamphorsulfonate*, $[\alpha]_D$ = +68°; *l-chloride*, $[\alpha]_D$ = —200°; *d-chloride*, $[\alpha]_D$ = +184°; *l-bromide*, $[\alpha]_D$ = —176°; *d-bromide*, $[\alpha]_D$ = +168°; *l-nitrate*, $[\alpha]$ = —164°; *d-nitrate*, $[\alpha]_D$ = +164; *l-sulfate*, $[\alpha]_D$ = —182°; *d-sulfate*, $[\alpha]_D$ = +180°; *l-dithionate*, $[\alpha]_D$ = —164°; *d-dithionate*, $[\alpha]_D$ = +160°. All are violet leaflets or needles except the bromide which is indigo blue. All crystallize without H_2O except the dithionates which have 1 mol. H_2O. Solns. of these salts racemize rapidly but the dry salts are perfectly stable. Whether this autoracemization which is accompanied by change to chloroaquo and diaquo salts is due to transformation to the *trans* form or to another kind of rearrangement is undecided. The 2 intra-radical Cl atoms can in some cases be replaced by other residues without loss of activity, *e. g.*, [Cl_2Co *en*$_2$]Cl + K_2CO_3 ⟶ [OC : O_2 : Co *en*$_2$]Cl, where the active carbonate salt has the opposit rotation to that of the dichloro salt from which it was formed. In other cases inactive forms result, *e. g.*, from active dichloro chloride, NaOH and NH_4Br give inactive *l*-hydroxo-aquo bromide; $NaNO_2$ gives inactive dinitro salts. The explanation of these activity changes is still to be found.

A. R. MIDDLETON.

Stereoisomeric Chromium Compounds. I. A. WERNER. Univ. Zurich. *Ber.*, **44**, 3132–40; cf. *C. A.*, **5**, 2453, 3770; **6**, 46, and preceding abstr.—The coördination compds. of Cr being similar to those of Co, it is likely that they might be similarly resolved into their optically active isomerides. This has been accomplished with one of the few compds of this type known, namely, 1,2-dichlorodiethylenediamine chromic series; [Cl_2Cr *en*$_2$]*X*. The case is one of mol. asymmetry I, similar to the one found in the case of Co. A freshly prepared satd. soln. of [Cl_2Cr *en*$_2$]Cl is treated with ammonium *d,α*-bromocamphorsulfonate. Violet cryst. plates of pure *l-dichlorodiethylenediamine-cobaltic d,α-bromocamphorsulfonate* soon sep. After sepn. of some racemic dithionate by means of $Na_2S_2O_6$, K_2PtCl_4 is added, and the *d*-form seps. as chloroplatinite. This may be converted to the nitrate by means of $AgNO_3$. The *l*-compd. may be prepared in similar manner. The chlorides, bromides and nitrates were also prepared. The active compds. have the same color as the racemic compds. but their solubility is different. For the chloride, $[\alpha]_M$ = —415.10° and +415.10°; bromide —419.9° and +400.52°; nitrate, —366° and +372°. These are about 150° less than the corresponding values for the Co compds., indicating that the amt. of

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the rotation is dependent upon the central atom as well as upon the combined groups. Racemization takes place rapidly in aq. soln., but less rapidly in HCl of half strength, in which case however, the rotation was much less. The prep. is given in detail.

H. GRUENER.

Dichlorodisulfamino-platinum Salts. Stereoisomerism of Platinum and Rearrangements of Amidosulfonic Acid. H. KIRMREUTHER. Charlottenburg. *Ber.*, **44**, 3115–21.—K_2PtCl_4 was treated with aminosulfonic acid and 2 salts were obtained, a more sol. yellow α salt, $[Cl_2Pt(NH_2.SO_3)_2]K_2 + 2H_2O$ and a less sol. almost colorless β salt, $[Cl_2Pt(NH_2.SO_3)_2]K_2$. These are not isomerides of the form: (1) $[Cl_2Pt(O_2S.NH_2)_2]K_2$; (2) $[Cl_2Pt(NH.SO_3H)_2]K_2$. This is shown by the neutrality of both, which excludes 2. Both act similarly toward KOH, dissolving with an intense golden-yellow color. Upon acidification $K_4[Cl_2.Pt(NH.SO_3)_2]$, is pptd.; it must be derived from 2. The explanation of the α and β salts above is that they are *cis* and *trans* modifications, similar to other cases as pointed out by Werner (cf. preceding abstr.), in the case of the 2 forms of dichloroplatosoamine. The modification corresponds to the *cis*-form. It is sol. in 38 parts H_2O, of yellow color, and with excess of aminosulfonic acid is converted to the more stable *trans*, β form. This latter compd. is less highly colored and is sol. in 342 parts H_2O. To obtain the *cis* salt, 5 g. K_2PtCl_4 are mixed with 30 cc. H_2O, filtered and 2 g. aminosulfonic acid, dissolved in 10 cc. H_2O, added. After several hrs. the color changes and compd. is pptd. It holds H_2O of crystn. firmly and upon heating decomposes quietly. The *trans*-salt is obtained by the action of more than 2 mols. aminosulfonic acid upon 1 mol. K_2PtCl_4. After some of the α salt ppts., the pure β salt is formed. Prep. of $[Cl_2Pt(NHSO_3)_2]K_4$. 1 g. of the β salt is mixed with a little H_2O, and treated with excess of KOH. Upon adding abs. alc. oily drops sep., which soon change to a cryst. mass. Reactions of these as also the prep. of Br and I compd. are described. H. GRUENER.

Constitution of the Stannic Acids. WERNER MECKLENBURG. *Anales soc. espan. fis. quim.*, **9**, 291–4.—A final statement of the results of M.'s investigation of the stannic acids. The so-called 5 stannic acids are really different colloidal states of a single acid, the adsorption curves being qualitatively identical but differing quantitatively owing to the varying size of the particles. The smaller the particles the more are the typical properties of the *a* acids produced, while the properties of the *b* acids are due to a coarser state of aggregation. H. S. PAINE.

Luminosity of Phosphorus. Lecture Experiment. L. MARINO AND C. PORLEZZA. *Gazz. chim. ital.*, **41**, II, 420–5; cf. *C. A.*, **5**, 3386. CHAS. A. ROUILLER.

Formation of Complex Compounds between Silver and Mercury Salts. BICE FINZI. Lab. chim. farm. r. univ. Parma. *Gazz. chim. ital.*, **41**, II, 538–43; cf. *Ibid.*, **32**, 2.—When solns. containing 0.39 g. Ag_2SO_4 and 0.185 g. $HgSO_4$ were treated with the calc. amt. of HCl to ppt. the Ag, from 0.05 to 0.1308 g. of the AgCl remained dissolved, the solubility increasing with the conc. of the $HgSO_4$ but not proportionally to it. If H_2SO_4 is added, the solubility of the AgCl is increased. The filtrate from the pptd. AgCl forms ppts. with HCl, chlorides and $AgNO_3$ but not with alk. sulfates, nitrates or acetates. When a large excess of $HgSO_4$ is used, HCl does not produce even a turbidity until a very large amt. of it is added. Other Hg salts (nitrate, acetate) show similar phenomena. These facts are probably due to the formation of complexes stable within certain limits of dilution and acidity. C. A. ROUILLER.

New Basic Silver-Mercury Compounds. BICE FINZI. *Gazz. chim. ital.*, **41**, II, 543–9; cf. preceding abstr.—Yellow HgO dissolves in solns. of Ag salts (nitrate, sulfate, acetate); the solubility increases with the diln. of the Ag salt and with the temp. The solns. become distinctly alk.; in the case of the sulfate and nitrate, the titer of

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the Ag salt remains unchanged, but in the case of the acetate it decreases and Ag is found in the undissolved portion of the HgO. From a cold satd. soln. of Ag_2SO_4 heated to b., treated with an excess of HgO, filtered after 10 min. and allowed to stand at room temp. for several days, was obtained a small amt. of light yellow rhombic tables rapidly turning dark in the light, decomp. by cold H_2O. They have the comp. $Ag_2SO_4.HgO$. From b. 2 *N* $AgNO_3$ were obtained radiating clusters of yellowish red needles having the comp. $AgNO_3.2HgO$. CHAS. A. ROUILLER.

The Precipitation of Nickel Compounds and Preparation of Spongy Nickel. W. H. LOW. *Analyst*, 36, 539–40.—Ni salts on treatment with NH_3 and b. give a green, cryst. ppt. which is easily filtered, but the filtrate contains enough Ni in soln. to render it slightly greenish in color, and further addition of NH_3 and b. fails to produce more ppt. A similar reaction occurs with excess of hydrazine, the ppt. being blue-violet in color and the filtrate contains Ni, which further addition of reagent and b. fails to ppt. If, however, the filtrate from the NH_3 ppt. is treated with hydrazine, the remaining Ni is completely pptd., though NH_3 fails to ppt. Ni from the hydrazine filtrate. Hydrazine will completely ppt. Ni from solns. containing NH_4 salts. Either of these ppts. may be easily reduced to spongy Ni by heating in H. The spongy Ni is free from fixed alkali. PERCY H. WALKER.

Bismuthides and Intermetallic Compounds. A. C. VOURNASOS. *Ber.*, 44, 3266–71; cf. *C. A.*, 5, 1885.—A thermal study has disclosed the existence of the following compds.: K_3Bi_2, K_2Bi, K_3Bi, Na_4Pb, Na_2Pb, $NaPb$, Na_2Pb_5, Na_4Sn, Na_2Sn, Na_4Sn_3, $NaSn$, and $NaSn_2$. When K bismuthide is heated in H to 380–400°, H is absorbed, yielding a pyrophoric material. At 700° the K is volatilized and Bi remains behind in combination with the H. The warm hydride is pyrophoric. On cooling it forms a gray, amorphous powder, which, in dry O, burns to H_2O and Bi_2O_3. V. proposes this method for preparing hydrides of other metals. EDW. WOLESENSKY.

Action of Hydrogen Peroxide on the Oxygen Compounds of Iodine. V. AUGER. *Compt. rend.*, 153, 1005–7; cf. *C. A.*, 5, 1885.—The alkali periodates, either neutral or basic, are reduced by the action of H_2O_2: $MIO_4 + H_2O_2 = H_2O + MIO_3 + O_2$. In the case of the basic periodates the free base formed also catalytically decomposes the H_2O_2. The decomp. of HIO_4 is greatly influenced by conditions. In dil. soln. and with a limited amt. of H_2O_2 the HIO_4 is instantly reduced to HIO_3, and a slight amt. of free I is also formed. In more conc. soln. and with excess of H_2O_2, more I is liberated. The reaction, however, is never complete, as the I is, in a few min., again oxidized to HIO_3. With $NaIO_3$, in satd. soln., the reaction starts very slowly, but is gradually hastened by the catalytic action of the NaI formed. HIO_3 at any conc. and at the b. temp., in the presence of the excess of H_2O_2, is completely broken down to free I. In the cold and with conc. of less than 6% HIO_3, the latter is slowly decomposed by H_2O_2 of any conc. Above 8% of HIO_3 the H_2O_2 is decomp., more or less rapidly, without the liberation of I. In fact if free I is added to such a soln. it is oxidized by the H_2O_2 with the evolution of little or no O. EDW. WOLESENSKY.

Europious Chloride. G. URBAIN AND F. BOURION. *Compt. rend.*, 153, 1155–8.—Pure $EuCl_3$ cannot be obtained from Eu_2O_3 by the action of S_2Cl_2, as is the case with the rare earth chlorides, but is mixed with varying quantities of $EuCl_2$. The latter may be obtained by heating $EuCl_3$ in H. The reduction starts at 270–5°, and takes place more rapidly at 400–50°. $EuCl_2$ appears to be non-reducible to a lower chloride at red heat. It is a white substance, appearing amorphous, dissolves quietly in cold H_2O, giving a neutral soln. which is barely opalescent. On concg. at 100° it decomposes thus: $12EuCl_2 + 3O_2 = 8EuCl_3 + 2Eu_2O_3$. EuOCl, obtained by the decomp. of $EuCl_3$ by dry air at 600°, is not reducible to EuO at a red heat.

EDW. WOLESENSKY.

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Artificial Diamonds (VON BOLTON). 8. Equilibrium in the Cobaltammines (LAMB, MARDEN). 2. Solubility of Magnesium Sulfate (SEIDELL). 17.

7. ANALYTICAL CHEMISTRY.

E. G. R. ARDAGH.

Modification of the Qualitative Analysis of a Complex Mixture by Boiling it with Sodium Carbonate. A. A. IVANOV. Imp. Univ. Kazan. *J. Russ. Phys. Chem. Soc.*, 43, 1258–61.—Instead of testing for the metals in one part of a complex mixture and for the acids in another part, I. starts with b. the whole with a large excess of Na_2CO_3. Filtration then yields all the metals as carbonates and all the acids as Na salts. A small portion of the original liquid is tested for Na and K. Among other advantages enumerated, the presence of metallic Hg in the ppt. would, in absence of Sn, indicate monovalent Hg, since Hg_2CO_3 easily decomposes into Hg + HgO + CO_2.

H. M. GORDIN.

The Volumetric Estimation of Sulfur in Iron and Steel. T. GIFFORD ELLIOT. *Chem. News*, 104, 298–301.—E. details the difficulties encountered in a volumetric estn. of S and recommends the following method: Mix 5 g. sample with 0.25 g. pure, finely powdered $K_4Fe(CN)_6$ and wrap the mixt. in one 11 cm. filter paper if the sample is graphitic Fe, or in 2 filters if it is steel or white Fe; place in a small covered porcelain crucible and anneal at 750–850° for 20 min. in a closed muffle. After a slow cooling outside the muffle, the drillings should be practically covered with the charred filter paper. Empty the cool crucible into a glass mortar and loosen the drillings with the pestle. Transfer the drillings to an evolution flask. The flask is then connected to a condensing tube 6 in. by 1 in., containing 2 in. of H_2O and standing in a beaker filled with cold H_2O; this in turn is connected to a flask containing 60 cc. $CdCl_2$ soln., which is in a similar manner connected to another flask containing more $CdCl_2$ soln. Add 50 cc. conc. HCl and heat the flask until frothing; as soon as the evolution of gas begins to slacken heat until just boiling. Boil as long as any appreciable amt. of gas is given off. Disconnect the app. and add I soln. in excess to the contents of the absorption flask, then 10 cc. dil. HCl (1–3) and shake. Titrate the excess of I with $Na_2S_2O_3$ soln. Usually nothing is found in the safety flask. When it is necessary to run a blank on the filter paper used, dissolve 5 g. C. P. Fe in HCl as usual. Then anneal another 5 g. C. P. Fe in the usual way and the difference is the amt. of S in the filter paper used in the annealing. The I soln. and the $Na_2S_2O_3$ soln. may be standardized against an Fe the S content of which has been detd. by the "aqua regia" or Bambers method. 1 cc. should equal 0.005% S in 5 g. of the sample. To prep. the $CdCl_2$ soln. dissolve 20 g. $CdCl_2$ in H_2O with a few drops of HCl. Add NH_4OH until $Cd(OH)_2$ completely dissolves. Then add AcOH until slightly acid, then add 20 cc. excess and make up to 2 l.

A. V. DELAPORTE.

The Determination of Sulfur in Pyrites. ARNOLD HECZKO. *Z. anal. Chem.*, 50, 748–53.—H. carried on a series of expts. with 2 samples of pyrites, to compare the method of Dennstedt, using a quartz combustion tube instead of Jena glass, with the method of Lunge. Conclusions: (1) For the rapid and accurate estn. of S in pyrites, the Dennstedt method is good. (2) The use of the quartz tube instead of the Jena glass is advantageous, retaining none or wholly negligible quantities of S and avoiding washing with water. (3) The pptn. of the H_2SO_4 as $BaSO_4$ must be carried on in fairly dil. soln. with an excess of $BaCl_2$ soln., about double the theoretical quantity being used. (4) The accordance with Lunge's method is very satisfactory; it is in general slightly higher.

MACKENZIE WILLIAMS.

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Rapid Analysis of Soft Solder. WM. P. WUNGER. *Metal Ind.*, 9, 469.—The % comp. of Sn-Pb alloys is detd. by taking the sp. gr. and referring to a standard curve. The detd. sp. gr. differs from the calc. sp. gr.; hence the curve. The method is accurate to 1%. MACKENZIE WILLIAMS.

Determination of Phosphorus in Pig Iron, Cast Iron, etc., without the Separation of Silica. EUGEN R. E. MÜLLER. *Chem. Ztg.*, 35, 1201–2.—The usual method involves sepn. of SiO_2 by 2 or more evapns. and heatings, and filtration. This is avoided in the following process: Dissolve 4 g. pig iron or cast iron with 60 cc. dil. HNO_3 with gentle heat. Pour into 100 cc. flask, fill to mark, mix, and filter. Of this use 25 cc. for P detn. Heat to b. with 2 cc. $KMnO_4$ soln. (40 g. per l.) to oxidize to H_3PO_4, and boil 2 min. Cool for 10 min. Decompose excess of $KMnO_4$ by sprinkling in Na_2O_2 and rotate. Bring sepd. MnO_2 into soln. by warming, and if necessary add 1 cc. of HNO_3 to complete soln. B. to decompose residual H_2O_2, ppt. with an equal vol. of $(NH_4)_2MoO_4$ soln., keep at 40°, and det. as usual. (1) The HCl usually used causes the sepn. of gelatinous SiO_2, and presence of traces will spoil results. (2) No more than 1 cc. of conc. HNO_3 may be added to hasten soln. of MnO_2, as excess gives low results, 5 cc. giving much too low. (3) Time occupied for pptn. 45 min. or just about equal to the time to sep. the SiO_2. (4) 50 cc. (= 2 g.) may be used to det. Mn., and 25 cc. for the colorimetric detn. of C according to Eggertz. (5) Results are concordant with Ledebur method. MACKENZIE WILLIAMS.

Estimation of Phosphoric Acid by Direct Weighing of Ammonium Phosphomolybdate. N. VON LORENZ. *Oesterr. Chem. Ztg.*, 14, 1–5; through *J. Chem. Soc.*, 100, II, 1028; cf. *C. A.*, 2, 2767.—Experimental details of methods previously advocated for the direct estn. of H_3PO_4 as NH_4 phosphomolybdate in soils, manures, and vegetable ash are discussed. A detailed account is given of L.'s method of preparing the required reagents, the amt. of material to employ, and the modifications recommended in the respective cases of various soils, sol. phosphatic manures, basic slag, superphosphates, and bone meal. E. J. C.

Notes on the Determination of Nickel. F. IBBOTSON. Met. Dept., Sheffield Univ. *Chem. News*, 104, 224.—It has been observed that the pptn. of Ni with dimethylglyoxime may be safely ignited to NiO without loss, if the filter is first carefully charred without causing it to take fire, then gradually heated to redness. It sometimes suffices in the analysis of German silver if the Ni content only is detd. and this can be done, without previously sepg. the Cu, by the following method: Dissolve 0.5 g. of the drillings in 10 cc. HNO_3 (1.2) and dil. to about 400 cc. with H_2O. Add 2 or 3 dg. of tartaric acid and NH_4OH in excess. Heat to 50°, add an excess of dimethylglyoxime reagent, and after allowing to stand in a warm place for a few min. with occasional stirring, filter and wash with hot H_2O containing NH_4NO_3 till the washings are colorless. Enclose the ppt., while still wet, in 2 filter papers, transfer to crucible and heat cautiously until the outer papers are thoroughly charred. Increase the temp. gradually and finish the ignition at a bright red heat. As the NiO will contain a small amt. of CuO, it is necessary to dissolve the pulp in equal vols. of HNO_3 and H_2O, filter off the residue, wash well and repeat the pptn., filtration, etc.

A. V. DELAPORTE.

The Bismuthate Method for Manganese. D. J. DEMOREST. Ohio State Univ. *J. Ind. Eng. Chem.*, 4, 19.—This paper shows results that would indicate that Cr has no effect on the detn. of Mn by the bismuthate method, and gives the methods used in the detn. A. V. DELAPORTE.

A Rapid Method for the Determination of Sulfur in Roasted Blende. C. C. NITCHIE. *J. Ind. Eng. Chem.*, 4, 30–2.—A full description with diagrams of app. of a rapid method

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of estg. S by heating the sample in air, absorbing the resulting oxides in an excess of standard alkali soln. and titrating the excess. A. V. DELAPORTE.

The Determination of Chromium and its Separation from Vanadium in Steels. J. R. CAIN. *J. Ind. Eng. Chem.*, 4, 17–9.—A description of the difficulties of the sepn. and estn., and C.'s method of overcoming them. A. V. DELAPORTE.

Volumetric Determination of Mercury. C. E. SMITH. *Chem. Eng.*, 14, 473–4.—The objectionable feature of the Hempel method (the long-continued shaking necessary to dissolve the compd.) may be avoided by adding the I soln. first, followed by the KI. In the Rupp method for mercuric compds. the reduction will take place with greater rapidity if a decided excess of alkali is added (not less than 10 cc. *N* soln. for 0.2 g. $HgCl_2$); furthermore, the acid added subsequently should not be in too great excess; use 0.5 g. $HgCl_2$, 25 cc. *N* alkali, and 5 cc. AcOH 36%. Mercurous compds. may also be titrated in HNO_3 soln. with NH_4SCN, the method being applicable to the oxide but not to any halogen compd. H. C. FULLER.

Titration of Potassium Cyanide in the Presence of Potassium Ferrocyanide. W. D. TREADWELL. *Mining Sci. Press*, 103, 655; see *C. A.*, 5, 3391. EDW. WOLESENSKY.

A New Reaction for Ferrous Oxide by means of Naphthenic Acid. I. I. LUTSHINNSKII. *Chem. Ztg.*, 35, 1204.—Test of the method of Kharichkov (*C. A.*, 5, 2476, 2788) shows that Fe^{II} naphthenate, free from Fe^{III} is insol. in benzene or ligroin while the soln. of the Fe^{III} of this salt is yellow. As the Fe^{II} oxidizes a brown color develops. S impurities give a green tint to the soln. J. C. HOSTETTER.

Potassium, its Titrimetric Estimation in Small Amounts. L. T. BOWSER. *J. Am. Chem. Soc.*, 33, 1752–7.—The nature of the ppt. is such that it is more easily treated if a mixt. of equal parts of EtOH and glacial AcOH be added as accelerating agents. The cobaltinitrite ppt. is treated with excess of standard $KMnO_4$ and titrated back with $H_2C_2O_4$. L. J. ROGERS.

Note on the Approximate Estimation of Starch by Iodine. LESTER REED. *Chem. News*, 104, 27.—An amt. of material containing presumably about 0.1 g. starch is heated to 190° for 5 min. in about 5 cc. glycerol. Dil. to 50 cc. and filter hot through a jacketed filter by the aid of a filter pump. In this case, an ordinary filter with Pt cone is the best. Ppt. cold with strong soln. of I in 10% KI. Allow to stand, filter through a paper moistened with the precipitant, and wash with b. 90% alc. Rinse the ppt. into a Pt dish with b. water. B. to expel I, evap. to const. wt., ignite and correct for ash. Great accuracy is not claimed. Applied to some materials, as bread or cocoa, it cannot be carried through in the manner described. E. WALLLER.

Electroanalysis. F. S. KIPPING, *et al. Brit. Assoc. Report*, 1910, 79–80; *J. Chem. Soc.*, 100, II, 824.—This report deals with the "electrodeposition of metals" (Perkin and Hughes, *C. A.*, 4, 1133, 1140), with "app. for the rapid electro-analytical sepn. of metals" (Sand, *C. A.*, 4, 529; cf. also *C. A.*, 5, 1349) and the "electro-detn. of Pb as peroxide" (Sand, *C. A.*, 4, 885). J. J. M.

Some New Features in the Electrolytic Determination of Lead. JOHN G. FAIRCHILD. *J. Ind. Eng. Chem.*, 3, 902.—Details are given for detg. Pb electrolytically with stationary electrodes. E. WALLER.

Rapid Methods for the Determination of Zinc. K. VOIGT. *Z. angew. Chem.*, 24, 2195–8.—Decompose 1–3 g. of the ore, slag, etc., with aqua regia, evap. to dryness and then heat on the sand bath. Treat the residue with 50–60 cc. conc. NH_4OH; Zn dissolves in the NH_4 salts, while SiO_2, Fe, Al, and Pb are pptd. Boil, cool, and dil. to 300 cc. with 1 : 3 NH_4OH. Filter off 100 cc. through a dry filter. For the gravi-

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metric detn., ppt. Mn with Br water, Ca with $(NH_4)_2CO_3$, and Mg with $(NH_4)_2HPO_4$. Ppt. Zn from the filtrate as phosphate by b. off NH_3 (cf. *C. A.*, 4, 433). For the volumetric detn., Al powder is added to the soln. containing the hydrated MnO_2 in suspension and all the Cu is pptd. by b. Add 5 cc. Na_2SO_3 soln. (1 : 4) and 1 cc. dil. NH_4OH. Heat to b. and filter; wash with a dil. NH_4OH soln. of Na_2SO_3. Neutralize the filtrate with HCl (1 : 3) and then add 10 cc. excess. Dil. to 150 cc., heat to b. and titrate with $K_4Fe(CN)_6$, using $(NH_4)_2MoO_4$ as outside indicator. The results by the 2 methods are in good agreement. J. C. HOSTETTER.

Differentiation of Gray Antimony and Antimony Oxide. ANON. *Z. öffent. Chem.*, 17, 384–7.—Gray Sb generally contains small amts. of undecomposed ore which can be distinguished by examg. with a lens. Pure Sb oxide is white or yellowish white. If necessary a test for sulfide may be made by b. with 30% NaOH, dilg. with water, filtering, and adding $Pb(OAc)_2$. With as little as 0.1% gray Sb the liquid becomes distinctly brown; larger amts. cause a black ppt. Under similar conditions Sb oxide gives no reaction or at most a very faint coloration. Insolubility is detd. by b. 2.5 g. sample with 1.25 g. KI, 45 cc. HCl (1.124), and 15 cc. water; the residue is washed with 6% HCl ignited and weighed; if a large residue is left, it may be necessary to add more KI. Sb oxide should not be over 0.5% insol. To det. the oxides of foreign heavy metals neutralize the filtrate from the insol. residue with 30–50% NaOH, add Na_2S soln., heat, filter, wash first with dil. Na_2S, then with 50% alc., ignite after moistening with HNO_3 and weigh as oxides. After igniting it is best to wash again to remove all Na_2SO_4. The filtrate is dild. to 500 cc., 50 cc. taken and the Sb detd. by adding AcOH in excess, heating on water bath for 2 hrs., filtering on an asbestos pad in a tube, washing first with 5% NH_4NO_3 containing a little H_2S and AcOH, then with alc. and ether and heating the ppt. in a stream of CO_2 to const. wt. If necessary, det. As in a sep. portion of 2.5 g. and deduct the calc. wt. of As_2S_3 from the Sb_2S_3 ppt. To det. the Sb_2O_3 dissolve 0.2 g. in HCl, add tartaric acid and excess of $NaHCO_3$, and titrate with I soln. using starch as indicator; if necessary correct for any As present. To det. Sb_2O_5 treat 0.2 g. sample and 0.4 g. KI in a Bunsen app. with 70 cc. 12.5% HCl, distil the liberated I into KI and titrate with $Na_2S_2O_3$. If Ca and Ba are to be detd. use 1 g. sample and sep. insol. residue and Sb as described above and det. Ca and Ba by ordinary methods. PERCY H. WALKER.

Colorimetric Determination of Phenols in Waste Waters. H. BACH. *Z. anal. Chem.*, 50, 736–40.—This method depends upon the color developed by Millon's reagent and a few drops of HNO_2, with phenol. This color is rendered stable enough for colorimetric comparison by bringing the test portion to the b. p., and allowing to stand for 2 hrs. This may then be compared with standards prepared in the same way. The quantity of phenol per l. should lie between 30 and 150 mg. to give the best results. L. J. ROGERS.

Determination of Cinnamic Acid in Water Solutions by means of Bromine. A. W. K. DE JONG. *Rec. trav. chim.*, 30, 223–4.—J. suggests the following method: The cinnamic acid should be in a very fine state of division to ensure soln. in water. Add Br as a 0.02 *N* soln. in water. The end of the addition is indicated when, after 5 mins., the yellow soln. is not discolored. Finally add KI and titrate the I which is liberated. The following results are given: 0.1105 g. cinnamic acid discolored 14.8 cc. 0.1 *N* Br., *i. e.*, 107.5% of Br has been added on, while the addition of two 0.1 *N* atoms of Br represent 107.6%. Similarly, 0.1195 g. of the acid discolored 16.1 cc. 0.1 *N* Br, *i. e.*, the acid added on 107.7% of Br. Again, 0.1070 g. of the acid, mixed with 0.5 g. BzOH, discolored 14.2 cc. 0.1 *N* Br, which corresponds with 0.1050 g. cinnamic acid. The method is a rapid one for the estn. of cinnamic acid, whether free or present as a salt radical, *e. g.*, a soln. of Ca cinnamate satd. at 26° and known to

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contain 0.242 g. Ca cinnamate, acidified with HCl, discolored 28.9 cc. 0.1 *N* Br soln., which corresponds with 0.241 g. Ca cinnamate. R. A. CUNNINGHAM.

The Mercury Cathode in Metal Separations. W. BÖTTGER. Leipzig. *Chem. Ztg.*, 34, 1033.—An app. for the rapid removal of the electrolyte and an elec. heating device are mentioned. Some results on the sepn. of Bi and Hg are reported.
E. J. WITZEMANN.

Electro-analytical Determinations (BAUMANN). 1. Detection of Carbon Disulfide in Oils (MILLIAN). 27. Apparatus for Filtration at a Constant Temperature (EISENSTEIN, ZIFFER). 22.

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8. MINERALOGICAL AND GEOLOGICAL CHEMISTRY.

R. C. WELLS.

Composition of Nephelite. N. L. BOWEN. *Am. J. Sci.*, 33, 49–54.—B. prepared soda nephelite by the fusion of Na_2CO_3, Al_2O_3, and SiO_2. Owing to the volatilization of the soda, th product was not pure nephelite, the excess of Al_2O_3 being in the form of corundum. The excess of SiO_2 did not appear in any form, showing that it was in solid soln. in the nephelite. This fact is borne out by the exam. of various analyses. The detn. of the limit of solubility was unsuccessful owing to the increasing viscosity and the necessity for crystn. at a low temp. B. agrees with Schaller (*C. A.*, 6, 1, 56) that the mols. with which the comp. of nephelites can be systematically expressed are $NaAlSiO_4$, $KAlSiO_4$ and $NaAlSi_2O_6$. A. A. KLEIN.

Baddeleyite from Montana. A. F. ROGERS. *Am. J. Sci.*, 33, 54–6.—Baddeleyite, ZrO_2, was found adhering to feldspar and corundum crystals in a gneissoid corundum—syenite. The mineral occurred in minute crystals and rounded blebs. It has cleavages in 4 directions, hardness about 6.5, and submetallic to metallic adamantine luster. The color is black, brownish translucent in fragments, double refraction is strong and n is greater than that of methylene iodide. It shows parallel extinction and slight pleochroism, is infusible before the blowpipe but glows when heated in the Pt forceps. It is insol. in aqua regia but is decompd. by H_2SO_4. Other chem. tests are given, which identify the mineral as baddeleyite. A. A. KLEIN.

Hydrocarbon Found in the Diamond and Carbonado District of Bahia, Brazil. J. C. BRANNER. *Am. J. Sci.*, 33, 25–6.—The mineral known as "gelo" is jet black and opaque, has a conchoidal fracture, a hardness of 2.2, sp. gr. 1.51, and is very friable. Analysis shows: H_2O 19.43%, volatil combustible matter 35.47%, fixed C 40.06%, ash 5.07%, sum 100.03%. The ash is mainly oxides of Al, Si, Ca, and Mg. The mineral shows a low cond. (about that of bituminous coal). B. does not think it is genetically related to the diamonds and carbonadoes of the region. A. A. K.

Artificial Diamonds. WERNER VON BOLTON. *Z. Elektrochem.*, 17, 971.—In 1910 B. discovered that diamonds are produced by the destructive action of Hg vapors upon C compds. Recent confirmatory tests are reported. 50 g. of Na amalgam (14% Na) were introduced into a test tube, 2 cm. wide and 40 cm. long. The upper half of the inner wall of the tube was painted with a thin soln. of water glass; while the surface was still moist fine diamond powder was sprinkled upon it. This powder had been prepared from natural stones ground to such a degree of fineness that it appeared amorphous under a magnification of 68 (photomicrographs shown). The test tube was heated to 100° and maintained at this temp. for 4 weeks, during which time a slow stream of moist illuminating gas was allowed to play over the surface of the amalgam. The powder was then again examd. under the microscope and numer-

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ous clear shiny diamond crystals were revealed. They were tested by the O combustion and the Na_2CO_3 fusion methods. By the slow action of the Hg vapors the hydrocarbon constituents of the illuminating gas had been broken up into H and C, most of this appearing as diamond and only very little of it as amorphous C.

C. G. FINK.

Siliceous Fossils. Algerian Infusorial Earth. M. LAHACHE. *Rev. gén. chim.*, 14, 357–63.—A history and description of Algerian infusorial earth and of some French deposits. Chem. analyses of 2 samples gave: H_2O 5.70–6.10%, SiO_2 72.60–80.40%, NaCl 0.30–0.20%, $CaCO_3$ 14.80–4.40%, $MgSO_4$ 2.20–1.60%, other impurities (*viz.*, Al_2O_3, Fe_2O_3, organic and insol. matter) 4.20–8.10%. Microscopic exam. of specimens showed them to be of both lacrustrine and marine origin. A. A. KLEIN.

A Theory of Ore Deposits in the Black Hills. F. C. NICHOLAS. *Mining World*, 35, 333–5.—Geologists claim that there is no mineralization east of the "Iron Dike." N. disagrees with them and claims the data suggest that the dike is a metamorphosed stratum of the Algonkian age and marks only a break in the Au formation rather than its eastern boundary. Arguments and illustrations are given to prove this.

A. A. KLEIN.

Occurrence of Potassium Nitrate in Western America. R. STEWART. *J. Am. Chem. Soc.*, 33, 1952–4.—A deposit of about 25 lbs. in a cave in southern Idaho, consisting chiefly of KNO_3 mixed with a little $CaSO_4$, is believed to have been carried through sandstone by percolating waters. A. A. KLEIN.

Comparison of the Huronian Iron Minerals of the U. S. and the Oölitic Iron Minerals of France. L. CAYEUX. *Compt. rend.*, 153, 1188–90.—Although the U. S. Fe minerals have been much altered by profound metamorphism, the evidence points to a similar origin to those of France. At least 3 types exist in the former, each of which has its counterpart in the latter: (1) oölitic minerals, (2) oölitic and encrinitic minerals, (3) exclusively encrinitic minerals. A. A. KLEIN.

Dimorphism of Rubidium Dichromate. J. A. LE BEL. *Compt. rend.*, 153, 1081.—That the 2 varieties of crystals of $Rb_2Cr_2O_7$ may be formed at the same time under certain conditions is shown by the fact that 2 curves of solubility cut each other at the transition point. A. A. KLEIN.

Origin of some Mineral Deposits by Bacteria. C. L. BREGER. *Mining World*, 35, 298–91.—Nitrifying bacteria are very active mineralizers and have played an important part in the formation of nitrate deposits in closed basins. Two general theories may account for the accumulation of the deposits: (1) Deposition may have resulted from downward percolation of dissolved nitrates produced by bacteria near the surface; (2) the nitrate solns. may have risen upward from bacteria living more deeply buried; (3) deposits may have arisen from disseminated nitrate salts, the latter being accumulations within a poorly drained basin. Bedded S deposits of Louisiana, Italy, German Silesia, and Galicia have also been formed by bacteria. It is probable that the S bacteria assimilate the H_2S from decaying organisms and break it up into S and H, the latter reacting with CO_2, forming CH_4, which escapes and O which is used by the bacteria. This theory and its applications are discussed in detail. B. also gives facts disproving the theory that S is formed by the percolation of atmospheric O into the zone of accumulation of H_2S and the formation of S by the following reaction: $H_2S + O = H_2O + S$. A. A. KLEIN.

Analyses of Stone Meteorites Compiled and Classified. O. C. FARRINGTON. *Field Museum Pub.*, 151 (*Geol. Series*), 3, 195–214.—This is a collection of all known meteorites, which appears thorough and complete, classified according to their comp., similar to the Cross-Iddings classification of rocks. Modification of that method and nomen-

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clature are given in detail, the names of the 5 sub-divisions being persilicic, dosilicic, silico-metallic, dometallic and permetallic. For these meteorites the ratio FeO : MgO of very nearly 4 : 1 is highly preponderant and characteristic. Avs. of all analyses of stone meteorites as well as of Fe meteorites are given, from which are deduced the proportions of the elements which would constitute the earth if the earth had been built up of such meteorites, the chief element being Fe. R. C. WELLS.

The Rare Gases of Fire Damp. C. MOUREU AND A. LEPAPE. *Compt. rend.*, **153**, 847–9.—An exam. of samples of fire damp from 5 localities showed that the gas consists of combustible hydrocarbons 97–99.6%, with small amts., traces to 2.80%, of CO_2, and a small residue of N. Further exam. of this residue disclosed the fact that there are also present very small quantities of the rare gases (0.037–0.065%). The quantities of He, together with traces of Ne, range from 0.0003 to 0.050%; and A with traces of Xe and Kr from 0.003 to 0.04%. The ratio of N to He is much larger than in air. The authors are unable to offer any satisfactory explanation to account for the occurrence of the rare gases. In none of the samples examd. were there present appreciable quantities of Ra Em. J. HUNT WILSON.

Interrelationship of the Rare Gases and their Relation to Nitrogen in Fire Damp. C. MOUREAU AND A. LEPAPE. *Compt. rend.*, **153**, 1043–5.—Tables are given showing the relationship of A : N in fire damp to A : N in air, similarly Kr : A, Xe : A, and Xe : Kr. They affirm that the law of the constancy of relation between chem. inert gases holds for fire damp as it does for natural gases. The amt. of He varies considerably, although it is always present. This is due to its being produced by the disintegration of radioactive substances which are not equally disseminated throughout the earth's crust. A. A. KLEIN.

Origin of Petroleum (IPAT'EV), (BREGER), (COSTE). **22.** Plasticity of Ice (HESS). **2.** Optical Temperature Coefficients of Rock-salt, Sylvite and Fluorite (SIEBREICH). **2.** Origin of Londer Oil and Western Phosphate (BREGER). **22.**

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9. METALLURGY AND METALLOGRAPHY.

WILLIAM BRADY, WILLIAM T. HALL.

Technical Review of Iron Smelting in 1910. BERNHARD NEUMANN. *Z. angew. Chem.*, **24**, 2451–9. E. J. C.

The Origin, Manufacture and Beauty of Tin. J. SCOTT. *Metal Ind.*, **10**, 7–8. E. J. C.

The Metallurgy of Zinc. W. R. INGALLS. *Eng. Mining J.*, **93**, 41–3.—Review relating to improvements during 1911. ROBERT KANN.

The Metallurgy of Lead in 1911. H. O. HOFMAN. *Eng. Mining J.*, **93**, 43–5. R. K.

Cyanidation in 1911. B. A. ROBINSON. *Eng. Mining J.*, **93**, 45–7.—The most notable progress was made in the adaptation of the CrN process to the treatment of refractory ores. R. K.

The Metallurgy of Copper in 1911. A. L. WALKER. *Eng. Mining J.*, **93**, 47–9.—Résumé concerning the noteworthy changes in processes. R. K.

Metallurgy of Iron and Steel. B. STOUGHTON. *Eng. Mining J.*, **93**, 50–2.—Review. R. K.

Notes on Pyritic Smelting. G. A. GUESS. *Eng. Mining J.*, **93**, 113–7.—Pyritic

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smelting is defined as the production of a ferrous silicate slag from FeS ore. There are 2 great variables, blast and silica; the 1st alters tonnage, the 2nd the ratio of conc.

ROBERT KANN.

Igneous Concentration of Zinc Ore. F. L. CLERC. *Eng. Mining J.*, 93, 127–31.—Suggestions respecting the use of the Wheterill process, simply reducing and burning the Zn, as a method of concg. Zn ore, the oxide product to go to spelter furnaces.

ROBERT KANN.

High-grade Bullion from Zinc Box Precipitates. J. B. AARONS AND HERBERT BLACK. *Mining World*, 35, 955–7.—An extra Zn box is used to aid pptn. at the Chaffers Au mine in western Australia, where the combined treatment of acid-oxidized ore and alk.-roasted ore is carried out. This caused a falling off in the value of the bullion, the standard of which was raised by mixing with the roasted or dried ppt. a flux as follows: 100 parts ppt., 50 parts borax, 20 parts sand, and in some cases 7 to 10% of niter has been added to the charge. This mixt. is smelted in clay liners in plumbago pots. It was found easier to produce high-grade bullion direct from the roasted or dried ppt. than to produce low-grade bullion and afterwards refine it. The use of liners inside the plumbago pots increases the standard by guarding against the reduction of metallic Zn from Zn sulfate or Zn silicate. No loss of Au could be traced to use of niter. Roasting at red heat is unnecessary in thoroughly acid-treated ppt., drying being better. Details of results are given. H. M. PLUM.

Malm Process for the Metallurgy of Complex Ores. A. G. BROWNLEE. *Mining World*, 36, 17–8.—Until quite recently the chlorination process has aimed only at the recovery of Au without regard to the base metals which in many cases exceed the worth of the recovered Au. In the Malm process the crushed ore is fed into a revolving tube mill where it is subjected to Cl action until 40–70% of the metals are chloridized. Then roasting follows, the heat being furnished by the burning S. The heat breaks up the Fe chlorides and the Cl and HCl set free convert the sulfides of Ag, Cu, Pb and Zn into chlorides and the Fe and Mn are eliminated from further reaction. As all the processes are exothermic, sufficient heat is evolved to dissolve even such chlorides as $PbCl_2$. The sol. chlorides are sepd. from the gang by filtration, and being agitated in the presence of metallic Cu, Au and Ag, are recovered. The Cu is removed by use of Fe and the Pb by means of Zn. The Zn is finally recovered by an electrolytic method. The entire loss of Cl is only about 2%. At least 90% of the value of all metals are recovered by this process and it can be used on ores which heretofore were regarded too refractory and complex for any known treatment. H. M. PLUM.

Some Observations on the Zinc Recovery Problem. W. G. SWART. *Mining World*, 36, 18.—A brief review with suggestions for possible improvements.

H. M. P.

Notes on Recent Metallurgical Progress. H. L. SULMAN. *Mining World*, 36, 22.—The influence of the ultraminute particle in some chem. reactions is given and a theory is advanced to explain it. The development of colloid chemistry may solve some of the problems involved in the treatment of slimes. Catalytic reactions will probably, in the future, play a more important part in metallurgical and electrostatic methods. A mere trace of Hg completely changes the properties of Al, making it oxidize with extreme rapidity in air and causes it to decompose water violently.

H. M. PLUM.

"The Vacuum Filter Process in Western Australia." T. B. STEVENS AND W. R. DEGENHARDT. *Met. Chem. Eng.*, 9, 394–6.—Stationary frame vacuum filter process is one of the chief methods now used for slime treatment in western Australia. No slime yet encountered has failed to yield to vacuum filtration. The worst filtering

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slime, an oxidized clay with no fine sand, gave a cake only $^{3}/_{8}$ inch thick, containing 3.46 lbs. dry slime per sq. ft, after 40 mins. of vacuum; it was successfully washed and discharged. Average oxidized slime will form in 25 min., a cake $1^{1}/_{4}$ in. thick carrying 8 lbs. of dry slime per sq. foot. An all-slimed sulfide product will in the same time form a 2½ in cake, carrying 18 lbs. of dry slime per sq. foot. A slime with uniform sized particles yields best results, while a close-packing variable sized slime gives greatest trouble. Cakes from oxidized slime contain 30–33% moisture and from all-slimed sulfide product, 23–26%. The frames are described. Finished cakes are blown off by air pressure from within and owing to the scarcity of water are not flushed out but are dumped through a trap door into a mixing tank where water is added to pulpiness. Rapid filling of filter vats is accomplished (*a*) by continuous pumping to storage above filter vats and (*b*) by a large pump intermittently operated. Respective advantages of (*a*) and (*b*) are discussed. The time of washing varies but is always greater than the time of taking cake. The amt. of water used is usually, in low grade slime, about $^{99}/_{100}$ more than that contained in the original pulp. J. R. W.

Manganese Bronze—an Historical Sketch. J. L. JONES. *Metal Ind.*, 10, 5–6. E. J. C.

Recent Progress in the Rust Proofing of Iron and Steel. P. S. BROWN. *Metal Ind.*, 10, 23–4. E. J. C.

Electrolytic Reduction of Nitrobenzene (SNOWDON). 10.

U. S., 1,013,134, Jan. 2. R. C. DAVIDSON. **Welding copper.**

U. S., 1,013,190, and 1,013,191, Jan. 2. A. W. MACHLET. **Case-hardening apparatus.**

U. S., 1,013,205, Jan. 2. I. F. MONELL. **Ore concentrator.**

U. S., 1,013,377, Jan. 2. L. H. J. DE BATS. **Hoist for crucible furnaces.**

U. S., 1,013,498, Jan. 2. W. KOEHLER. **Reducing ores.**

U. S., 1,013,548, Jan. 2. C. M. GREY. **Vacuum and pressure method of making castings.**

U. S., 1,013,614, Jan. 2. J. S. ROBESON. **Pyrites briquet bonded by sulfite liquor.**

U. S., 1,013,620, Jan. 2. W. SCHIEBER. **Welding copper or nickel and copper and nickel alloy.**

U. S., 1,013,635, Jan. 2. J. O. BARDILL. **Apparatus for separating dross from molten lead.**

U. S., 1,013,702, Jan. 2. A. TROPENAS. **Side-blown Bessemer converter.**

U. S., 1,013,860, Jan. 9. F. E. CANDA, New York, N. Y. **Forming composit metal ingots.**

U. S., 1,013,931, Jan. 9. C. G. FINK. **Reducing silver ores.**

U. S., 1,013,961, Jan. 9. S. B. SHUTTS and W. MCHUGH. **Safety device for blast furnaces.**

U. S., 1,014,061, Jan. 9. H. K. HESS. **Recovering copper from its ores.**

U. S., 1,014,062, Jan. 9. H. H. HUGHES. **Producing zinc oxide from sulfide ores.**

U. S., 1,014,218, Jan. 9. R. A. HADFIELD. **Producing a magnetic iron alloy of high permeability and low hysteresis action.**

U. S., 1,014,224, Jan. 9. W. L. IMLAY. **Apparatus for recovering gold and silver by use of cyanide solutions.**

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U. S., 1,014,425, Jan. 9. W. R. WALKER. **Making steel.**

U. S., 1,014,454, Jan. 9. W. G. CLARK. **Copperizing iron.**

U. S., 1,014,642, Jan. 16. P. DEBAS. **Alloy containing Si 53.53%, Al 25.98%, Fe 17.18% and Ti 2.7%.**

U. S., 1,014,749, Jan. 16. C. F. BURGESS. **Coating iron by applying granular $FeZn_{10}$ and heating.**

U. S., 1,014,750, Jan. 16. *Idem.* **Coating iron by heating with $FeZn_{10}$ and Zn.**

U. S., 1,014,751, Jan. 16. *Idem.* **Making granular $FeZn_{10}$ by tumbling Zn dross at red heat with Fe.**

U. S., 1,014,827, Jan. 16. O. H. KING. **Ore concentrator.**

U. S., 1,014,868, Jan. 16. A. GADOMSKY. **Extracting copper from calcined ore or slags.**

U. S., 1,014,946, Jan. 16. C. F. BURGESS. **Alloy for coating iron, formed from $FeZn_{10}$ and Zn.**

U. S., 1,014,971, Jan. 16. J. R. MOFFITT. **Metallurgical furnace.**

U. S., 1,014,977, Jan. 16. B. S. SMITH. **Apparatus for concentrating and classifying sulfide ores.**

Ger., 229,560, Mar. 2, 1910. W. ROSS WARREN. **Centrifugal drum** for the production of granulated blast-furnace slag, the walls of which have outlet openings for the liquid fed into the interior to moisten the grains of slag.

Ger., 229,580, Dec. 3, 1909. A. KÜSTER. **In a device for catching slag when casting,** the provision of horizontal notches on the lower end of its front wall serving as inlet and outlet, together with an outer flange provided with transverse ribs.

Ger., 230,090, Apr. 6, 1910. A. GOUILLON. **Mfg. converter** (Bessemer, etc.) **bottoms** by assembling pressed and burned plates or molded bricks which are not perforated, but which have lateral grooves which on assembling form the blast openings. Fe rods may be imbedded to give the plates greater solidity.

Ger., 230,363, Feb. 8, 1910. P. JUNKER. Double acting **hot air blast damper** to be closed by a wedge.

Ger., 230,574, July 8, 1909. BUNZLAUER WERKE LENGERSDORF & CO. A battery of **muffle furnaces for production of zinc** with independent fire for each muffle.

Ger., 230,601, May 16, 1909. W. C. PATERSON. **Lixiviation apparatus for ores.** cf. U. S. Pat., 923,571.

Ger., 230,626, Aug. 26, 1908. R. M. SIMPSON. **In an app. for the separation of ore from gang,** the pulp is centrifuged against an opposing current of water.

Ger., 230,695, Jan. 30, 1910. D. L. TH. GRONEMAN. **Charging apparatus for cupola furnaces** with a conveying vessel suspended on the movable arm of a traveling crane.

Ger., 231,001, May 17, 1909. U. WEDGE. App. for **charging fine ore into mechanical roasting furnaces;** see U. S. Pat., 927,389.

Ger., 231,499, Nov. 13, 1909. FR. KOHLHAAS. **Non-magnetic steel** for tools, of great ductility contg. 9.8–10.3% of Mn, 0.9–1% C, 0.2–1.4% Ti, 0.4–0.7% Si, up to 0.03% S, and up to 0.015% P. This steel can be cast from the crucible as well as from acid process. As a rule steel poor in C and 80–85% ferro-manganese is used.

Ger., 231,971, Aug. 24, 1906. SOC. ANON. ITALIANA GES. ANSALDO ARMSTRONG & CO. Mfg. **armor plates** of steel or steel alloys.

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10. ORGANIC CHEMISTRY.

J. BISHOP TINGLE.

Substitution in Aromatic Hydroxy Compounds. I. The Action of Nitric Acid on Gallic Acid Trimethyl Ether and Pyrogallolcarboxylic Acid Trimethyl Ether. V. J. HARDING. Rajshahi Coll., E. Bengal, India. *Proc. Chem. Soc.*, **27**, 213; *J. Chem. Soc.*, **99**, 1585–98.—When gallic acid trimethyl ether is nitrated under varying conditions the principal product in each case is 5-nitropyrogallyl trimethyl ether. The other product present in considerable quantities is nitrogallic acid trimethyl ether. When pyrogallylcarboxylic acid trimethyl ether is nitrated under similar conditions only the nitro acid was formed, no substitution of the CO_2H group being observed. The hypotheses is advanced that CO_2H substitution is governed by those forces in the mol. which direct substitution in the parent phenol ether, and that there is no real difference between H substitution and CO_2H substitution. E. E. GORSLINE.

Trialkylammonium Nitrites and Nitrites of the Bases of the Pyridine and Quinoline Series. P. NEOGI. Rajshahi Coll., E. Bengal, India. *Proc. Chem. Soc.*, **27**, 208; *J. Chem. Soc.*, **99**, 1598–1601.—*α-Picolinium nitrite* was obtained, together with the nitrate, by treating picoline hydrochloride with $AgNO_2$, immersing the container in ice. The mixture crysts. upon concentrating the soln. in a vacuum desiccator over H_2SO_4. *Quinolinium nitrite* exists only in soln. *Piperidinium nitrite*, $C_5HN_{11}HNO_2$, was similarly made; colorless plates. It sublimes at 80–100°, press. 10–20 mm., decompg. into nitrosopiperidine at 110–20°. *Pyridine methonitrite* is a reddish yellow liquid. *Piperidine methonitrite*, $C_5NH_{11}.MeNO_2$, crysts. in colorless plates which are extremely hygroscopic. Picoline methonitrite, $MeC_5NH_4.MeNO_2$, forms colorless crystals, a red color present being due to an impurity. *Quinoline methonitrite*, $C_9NH_7.MeNO_2$, forms in dark red crystals. E. E. GORSLINE.

Salts of 3,5-Dinitroquinol. W. B. SHAW. *Proc. Chem. Soc.*, **27**, 98; *J. Chem. Soc.*, **99**, 1609–15.—A complete series of alkali metal salts of 3,5-dinitrophenol has been made by adding an alc. soln. of the metallic hydroxide to an Et_2O soln. of the free nitro compd. The neutral salts are in every case darker in color than the acid salts and the color deepens as at. wts. of the metals increase. The known Ba salts (Nietzki, *Ann.*, **215**, 144 (1881); *Ber.*, **11**, 470 (1878)) have been again investigated. The neutral salt, $C_6H_2(NO_2)_2O_2Ba.H_2O$, a dark blue cryst. compd., is fairly explosive. The mol. of H_2O can be removed by moderate heating or by means of a vacuum desiccator containing H_2SO_4. The acid salt, $[HOC_6H_2(NO_2)_2O]_2Ba.2H_2O$, deposits deep red crystals. *Neutral lithium salt*, $C_6H_2(NO_2)_2(OLi)_2.H_2O$, deep violet. *Acid salt*, $HOC_6H_2(NO_2)_2OLi$, red. *Neutral sodium salt*, $C_6H_2(NO_2)_2(ONa)_2$, blue. *Acid sodium salt*, $HOC_6H_2(NO_2)_2ONa$, brown. *Acid potassium salt*, brown. *Neutral potassium salt*, dark violet. *Lithium 3,5-dinitroquinol 1-monomethyl ether*, $MeOC_6H_2(NO_2)_2OLi$, was made by dissolving the monomethyl ether in warm $CHCl_3$ and adding a MeOH soln. of LiOH. *Sodium salt* and *potassium salt* were also prepared. The ammonium salts could not be prepared, as NH_3 was readily evolved. It is believed that dinitroquinol contains the NO_2 groups in the *m*-position to one another and not in the *p*-positions as assumed by Beilstein. E. E. GORSLINE.

2,2′-Dibromodiphenyl and 2,2′-Dichlorodiphenyl. J. J. DOBBIE, J. J. FOX AND A. J. H. GAUGE. Government Lab., London. *Proc. Chem. Soc.*, **27**, 217; *J. Chem. Soc.*, **99**, 1615–20.—When CuBr acts on the tetrazonium salt derived from 2,2′-diaminodiphenyl, according to conditions, the products are mainly diphenyleneazone $(C_6H_4N)_2$, and carbazole; or a small amt. of *2,2′-dibromodiphenyl*, large quants. of carbazole and traces of diphenyleneazone. *2,2′-Dibromodiphenyl*, crysts. from EtOH in long prisms, m. 81°. When dissolved in dry EtO_2 and treated with Na, diphenylene

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results. Fluorene results from the action of Na on a mixture of 2,2'-dibromodiphenyl and methylene dibromide. *2,2'-Dichlorodiphenyl* crysts. from light petroleum in nodular masses, m. 59°. E. E. GORSLINE.

β-Chlorocinnamic Acids. T. C. JAMES. Edward Davies Labs., Aberystwijth. *Proc. Chem. Soc.*, **27**, 216; *J. Chem. Soc.*, **99**, 1620–7.—The β-chlorocinnamic acids have been prepared by the addition of hydrogen chloride in aq. soln. to phenylpropiolic acid (Mulliken, *Diss.*, Leipzig, 1890); by the addition of hydrogen chloride to phenylpropiolic acid in AcOH soln. at ordinary temp. (Michael and Pendleton, *J. prakt. Chem.*, [ii], **40**, 65 (1889)) and by the action of PCl_5 on the esters of benzoylacetic acid (Perkin, *J. Chem. Soc.*, **47**, 256 (1885)) and the proportions of the isomerides found in each case detd. A quant. sepn. by means of the Ba salts is possible, the salt of the *allo* acid being readily sol. The transformation of the acid m. 132.5° into the acid m. 142°, under the influence of heat and of sunlight and the rate of elimination of HCl by means of alkali establishes the acid m. 132.5° as the *allo*-isomeride. *Ethyl β-chlorocinnamate*, b. 293°. *Amide*, needles, m. 118°. *Anilide*, needles, m. 128°. *p-Toluidide*, needles, m. 122.5°. *Ethyl β-chloroallocinnamate*, b. 265°. *Amide*, needles, m. 76°. *Anilide*, needles, m. 134.5°. *p-Toluidide*, needles, m. 142°. E. E. GORSLINE.

Condensation of Crotonaldehyde. I. SMEDLEY. Lister Inst. of Prevent. Med., Chelsea Gardens, S. W. *Proc. Chem. Soc.*, **27**, 208; *J. Chem. Soc.*, **99**, 1627–33.—Crotonaldehyde prepared by Delépine's method (*C. A.*, **3**, 782) was allowed to stand with *N*/10 K_2CO_3 for 3 d. The product, after neutralization with HCl and treatment with an excess of $BaCO_3$ was conc. under diminished press. and extracted with Et_2O. A viscid oil, $C_8H_{12}O_2$, resulted. When oxidized with Ag_2O and subsequently reduced with P and HI this product yielded *n*-octoic acid. The γ-C at. of 1 crotonaldehyde mol. must therefore react with the CHO of the second mol. E. E. GORSLINE.

Investigations on Complex Compounds. Complex Dioximines. L. A. CHUGAEV. *J. Russ. Phys. Chem. Soc.*, **42**, 1466–87; cf. *C. A.*, **2**, 2809.—1. *Complex cobaltiac of pyridine and dimethylglyoxime*, $(Co_2PyD_2H_2)Cl$ (I), was made (assisted by A. POSTNIKOV) by passing air through a soln. of dimethylglyoxime, $CoCl_2$ and pyridine in dil. alc. (50–75%), and pptg. with alc. + Et_2O. By adding KOH to (I) the *free base* is liberated as a dark brown cryst. mass which soon loses H_2O (from the external OH and an H of the oxime), and then has the formula Co_2PyD_2H. The elec. cond. of its solns. greatly increases with diln., indicating hydrolysis: $Co_2PyD_2H + H_2O = (CO\text{-}_2PyD_2H_2)OH$. 2. *Salts of cobaltidihydroxylaminodimethylglyoxime* (with I. KIREYEV): A *chloride*, $(Co_2NH_2OHD_2H_2)Cl$, was made by passing air through a soln. of Na, NH_2OH, HCl, $CoCl_2$ and dimethylglyoxime in abs. alc.; yellowish brown cryst. KI changes the chloride to an *iodide*. Both salts are more stable than most compds. with an NH_2OH complex. 3. *Methylglyoxime complexes* (with Iv. TISHCHENKO): The object was to det. the influence of the groups R_1 and R_2 in the disubstituted glyoxime, $R_1C(:NOH)C(:NOH)R_2$, on its complexes. *Methyl glyoxime* (II) was made by dissolving $NaNO_2$, KOH and $AcCH_2CO_2Et$ in H_2O, making liq. acid with H_2SO_4, after 24 hrs. while passing air through it, extracting with Et_2O, evapg. latter, and warming the remaining isonitrosoacetone with $NH_2OH.HCl$ and NaOH; cryst.; yield, 70%. With divalent Fe, Co, Cu; Pt, Pd and Ni (II) gives complex compds. The *nickel compound*, $NiC_8H_{10}O_4N_4$ (III), was obtained by adding $NiCl_2$ and $AcONH_4$ to a soln. of (II) in alc., dark red cryst., changing to a more stable orange modification on warming; is decomposed by mineral acids; from a soln. in AcOH alkalies ppt. the red modification. The 2 modifications are supposed to be geometrical isomers. *Cobaltiaminochloromethylglyoxime*, $CoD_2H_2NH_3Cl$, was made from (II), purpureo cobaltichloride, $AcONH_4$ and AcOH;

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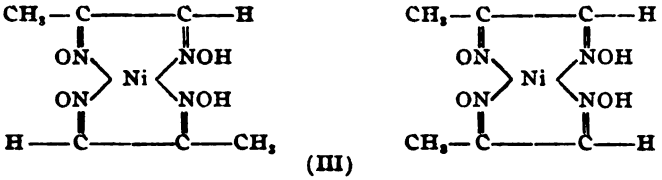
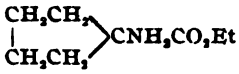
cryst. *cobaltidiaminomethylglyoxime chloride*, $(Co_2NH_2D_2H_2)Cl$, from (II), NH_3 and



(III)

$AcONH_4$; small plates. *Cobaltidiaminomethylglyoxime iodide*, from preceding by KI; yellowish brown cryst.; AgOH liberates *free base* from it. 4. *Action of acids on Ni dioximines* (with B. Afanásev): The action of $NiCl_2$ on methylglyoximine is a reversible reaction: $NiCl_2 + 2DH_2 \rightleftarrows NiD_2H_2 + 2HCl$. With weak acids the reverse reaction is almost unnoticeable. A table is given showing the influence of the strength of the acids in decomposing the complexes of glyoxime, methylethylglyoxime, dimethylglyoxime and methylglyoxime. HCl, HBr and HNO_3 were alike in exercizing a strong influence, while AcOH had very little effect. The glyoximine was made from glyoxal bisulfite, $NH_2OH.HCl$ and NH_3. By treating it with $NiCl_2$ and NH_3 a *nickel complex*, $NiC_4H_6N_4O_4$, was made; orange-yellow ppt. The stability of the glyoximine complexes is according to the following ascending series of glyoximes: glyoxime, methylglyoxime, dimethylglyoxime and methylethylglyoxime. H. M. Gordin.

Simple and Convenient Method of Obtaining the Free Esters of Amido Acids. N. Zelinskii, A. Annenkov and I. Kulikov. Univ. Moscow. *J. Russ. Phys. Chem. Soc.*, **43**, 1091–1101.—Curtius' method (*Ber.*, **16**, 753) is unsuitable when the exact amt. of esters is unknown. Fischer's method (*Ber.*, **34**, 433) is cumbersome and connected with loss of material. The authors' method consists in mixing the dry salt of the ester with an excess of $Pb(OH)_2$ and distilling off the liberated ester *in vacuo*. Yield, 85–95% of the salt. *Ethyl amidoisobutyrate* $C_6H_{13}NO_2$, by above method from the ester of the hydrochloride of amidobutyric acid prepared by the action of AcMe on the acid (*Ber.*, **39**, 1722); b_{10-11} 38.5–41°; d_4^{17} 1.0974; n_{20} 1.4169. *Ethyl α-amidocyclopentanecarboxylate* (I), from the corresponding hydrochloride obtained by treating



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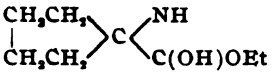
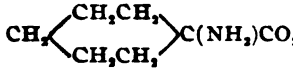
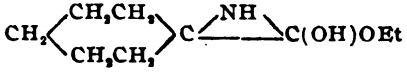


(II)

cyclopentanone with NH_4Cl and KCN and esterifying the product (*C. A.*, **2**, 2796); b_{10} 80°; d_4^{20} 1.0292; n_{20} 1.4531; the value of MR calculated from that of *n* would agree a little better with the theory (41.63), if the ester were assigned the tautomeric formula (II). *Ethyl α-amidocyclohexanecarboxylate*, either (III) or (IV), by similar method as



(III)



(IV)

preceding from cyclohexanone; b_{14} 100°; d_4^{20} 1.0182; n_{20} 1.4614; is very stable in sealed vessels. *Ethyl methylaspartate*, $MeC(NH_2)(CO_2Et)CH_2CO_2Et$, by a similar method from Et acetoacetate; b_{12} 112.5–3°; d_4^{20} 1.0632; n_{20} 1.4332; is very stable in sealed vessel. *Ethyl α-methylamidopropionate*, from the hydrochloride of methylalanine by similar method; b_{65} 75–6°; b_{745} 147–8°; d_4^{20} 0.9533; n_{20} 1.4128. Applying the method to the hydrochloride of Et α-amidopropionate the authors obtained, along with the desired ester, Et dimethyliminodiacetate, $NH[CH(CO_2Et)(Me)]_2$ (cf. Ciamician and Silber, *C. A.*, **1**, 415); b_{10} 114–5°; d_4^{20} 1.0152; n_{20} 1.4728. H. M. Gordin.

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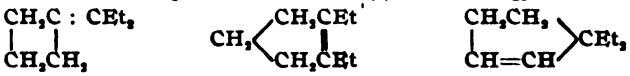
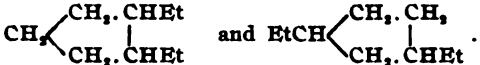
Santene and its Hydrohalides. I. KONDAKOV. Lab. Pharm. Inst., Yurev. *J. Russ. Phys. Chem. Soc.*, 43, 1107–16.—Contrary to the statement of Ashan (*C. A.*, 2, 836) it is impossible to isolate pure santene from pine oil by fractional distillation, the lower fractions containing a hydrocarbon resembling the one of Müller (*Arch. Pharm.*, 238, 344), while the higher contain pinene and camphene. By treating the different fractions with HCl Cl derivatives were obtained resembling those made from the lower and the higher b. isomeric santenes. Contrary to the statement of Semmler pure santene obtained from sandalwood oil gives a perfectly stable hydrochloride $C_9H_{15}Cl$. When b. with KOH in alc. only part of it decomposes giving santene, the remaining part m. 59° and b. 70–2°. Only at 170° in sealed tube does KOH remove the HCl giving santene and an *ether* b. 195°. With HBr santene gives 2 isomeric *hydrobromides* $C_9H_{15}Br$, one liquid b_8 79–81°, the other solid m. 18–25°. With KOH in alc. both of them yield the same products as the hydrochloride, but the amt. of stable hydrobromide is smaller. Both the santene from sandalwood oil and that recovered from its hydrohalides give upon oxidation with $KMnO_4$, among other products, santene-glycol. By treating santene with AcOH at ordinary temp. according to the author's method (see patent literature), *santene acetate* $C_9H_{14}AcOH$ was obtained; b_8 85–9°; d_{20} 0.9859; n_D 1.45929; $[\alpha]_D = 0°$. H. M. GORDIN.

Transformations of Cyclobutyldiethylcarbinol. N. KIZHNER. Org. Lab. Tomsk Technol. Inst. *J. Russ. Phys. Chem. Soc.*, 43, 1149–57.—The hydrocarbon C_9H_{16}, previously obtained by the action of $(CO_2H)_2$ on cyclobutyldiethylcarbinol (*Ibid.*, 37, 517) was at that time given the formula (I). In analogy with the isomerized



(I) (II) (IV)

hydrocarbons obtained in the meantime from cyclobutyldimethylcarbinol K. (together with V. AMOZOV) now gives it the formula of 1,2-diethylcyclopentene (II) (b_{744} 151.5–2°). Reduction of (II) with conc. H_2SO_4 gave, besides the previously obtained hydrocarbon C_9H_{18} (*a*), a *polymer* $C_{18}H_{32}$; b_{15} 168–73°; b. 295–300°; absorbs Br and decolorizes $KMnO_4$. If (II) be reduced with HI another *hydrocarbon* C_9H_{18} (III), isomeric with (*a*), is produced; b_{760} 146–8°; d_0^{20} 0.7839; n_D 1.4305; reacts with HNO_3 (1.52) with evolution of heat. (*a*) cannot be isomerized to (III) by b. with HI. The formulas of (*a*) and (III) are supposed to be



(III)

By treating cyclobutyldiethylcarbinol with fuming HI and b. the resulting iodide with KOH in aq. alc. the author (together with S. VOZNESENSKII) obtained *1,1-diethylcyclopentene-2* (IV), isomeric with (II); b_{754} 143.5–4.5°; d_0^{20} 0.8084; n_D 1.4455; gives green color with H_2SO_4 + alc. Hot $KMnO_4$ oxidizes (IV) to an *acid* $C_7H_{14}(CO_2H)_2$ m. 85° which by b. with Ac_2O changes to an *anhydride* $C_7H_{14}(CO)_2O$ m. 10–1° and b. 190°. The latter gives with $PhNH_2$ an *anilidoacid* $C_7H_{14}(CO_2H)CO.NHPh$, m. 142° which on warming changes to the *anilide* $C_7H_{14}(CO)_2NPh$, m. 163°. Fuming HBr converts cyclobutyldiethylcarbinol into *1,1-diethylbromocyclopentane* $C_9H_{17}Br$ (b_{24} 105–6°; d_0^{20} 1.2005; n_D 1.4895) which is changed by b. KOH into (IV) and reduced by the Zn–Cu couple to *1,1-diethylcyclopentane* C_9H_{18}; b_{757} 150.5°; d_0^{20} 0.8028; n_D 1.4388; does not react with fuming HNO_3. On reducing (IV) with conc. H_2SO_4 it changes to (*a*). H. M. GORDIN.

Transformations of Thujane. N. KIZHNER. Org. Lab., Tomsk Technol. Inst. *J. Russ. Phys. Chem. Soc.*, 43, 1157–63.—The thujane obtained previously (*Ibid.*, 42,

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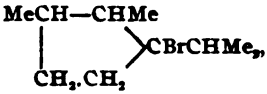
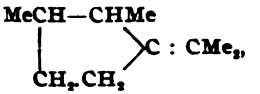
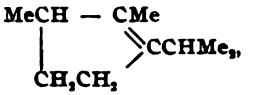
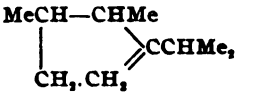
1203; *C. A.*, 6, 84) was made from a thujylhydrazine in the prep. of which evapn. of a salt of the latter was used. It is now found that even a slight excess of acid, when warmed with the base, inverts it, so that the thujane furnished by this method has too low a rotation. By reducing thujylidenehydrazine with Na in alc. and directly oxidizing the resulting mixture of thujylhydrazine and thujylamine with $K_3Fe(CN)_6$, a thujane (I) of following consts. is formed: b_{746} 157.7.5°; d_0^{20} 0.8171; n_D 1.4412; $[\alpha]_D$ 69.29°. Hot dil. H_2SO_4 hardly affects (I); even heating with this acid to 140° for 8 hrs. only slightly reduces the rotation. In the former article (*loc. cit.*) it was mentioned that fuming HBr converts (I) into an unstable *bromide* (II) which hot K_2CO_3 changes to an unsatd. hydrocarbon $C_{10}H_{18}$. It is now found that prolonged digestion with this acid (2 months) yields a very stable isomeric bromide $C_{10}H_{19}Br$ (III); b_{19} 111–2°; d_0^{20} 1.1812; n_D 1.4897; optically inactive; is not affected by hot KOH. Reduction of (III) with the Zn–Cu couple yields a *satd. hydrocarbon* $C_{10}H_{20}$ (IV); b_{746} 157°; d_0^{20} 0.7923; n_D 1.4377. Distilled with quinoline (III) yields an unsatd. hydrocarbon $C_{10}H_{18}$; b_{755} 162–4°; d_0^{20} 0.8108; n_D 1.4527; optically inactive; gives a raspberry color with conc. AcOH. On digesting (I) with fuming HBr for 2 days an *unstable bromide* was produced which upon decomp. with KOH gave an unsatd. hydrocarbon b_{755} 163–4°; $d_4^{18.5}$ 0.8131; n_D 1.454; $[\alpha]_D$ 2.88°. By shaking (I) with fuming HI and decomp. of the resulting iodide with KOH in aq. alc. an *unsatd. hydrocarbon* was obtained b_{742} 162–3°; d_0^{20} 0.9105; $[\alpha]_D$ 0.22°. The consts. of the latter in another expt. were: b_{751} 162.5–3.5°; d_0^{20} 0.8111; n_D 1.4527; $[\alpha]_D$ 0.2°; gives raspberry color with AcOH. On treating (I) with Br and decomp. of the resulting dibromide with KOH in alc. an unsatd. hydrocarbon $C_{10}H_{18}$ was obtained; b. 162–4°; d_0^{20} 0.8163; n_D 1.452; $[\alpha]_D$ 23.62°. The stable and the unstable bromides (II) and (III) are supposed to be stereoisomers of the formula



while for the several stereochemically isomeric hydrocarbons $C_{10}H_{18}$ one of the 3 following formulas are suggested:

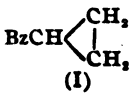




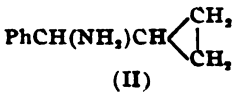


H. M. Gordin.

Action of Trimethylenecarboxylyl Chloride on Benzene in Presence of Aluminium Chloride. N. Kizhner. Org. Lab., Tomsk Technol. Inst. *J. Russ. Phys. Chem. Soc.*, 43, 1163–73.—In the prep. of benzoyltrimethylene, (I), by Perkin's method, the author started with chlorobromoethylene $Cl(CH_2)_2Br$ instead of $(CH_2)_2Br_2$ used by Perkin. Obtained by this method (I) b. 247.3° and m. 5° (Perkin gives: b_{730} 239–



(I)



(II)

9.5°; liquid even at —10°); d_0^{20} 1.0561; n_D 1.553; is not affected by cold $KMnO_4$; gives with HBr a bromide $Bz(CH_2)_3Br$ m. 30–30.5° (Perkin, 39°). The author made (I) from trimethylenecarboxylyl chloride and C_6H_6 in presence of $AlCl_3$ at 60° (sharp); yield, 77%; smells like AcPh and has consts. like that obtained by Perkin; seems to contain some unsatd. ketone (shown by behavior with $KMnO_4$). Oxidation of (I) with CrO_3 gave CO_2 and BzOH, and with HNO_3 these and $(CO_2H)_2$; in neither case was AcOH formed. *Semicarbazone* $C_{11}H_{13}N_3O$, m. 184°. *Oxime* $C_{10}H_{11}NO$ (*a*), m. 86–9° (Perkin, 90–2°); liquefies on prolonged exposure to the air. *Hydrochloride* of

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(*a*) $C_{10}H_{11}NO.HCl$ (*b*), by passing dry HCl into a soln. of (*a*) in Et_2O, m. 118–9° to violet liquid. Recovered from (*b*) (*a*) m. 90–1°. By the action of hot dil. HCl on (*a*) (I) is regenerated. The bromide made from the author's (I) m. 35° and is reconverted into the latter by hot KOH in alc. Fuming HNO_3 changes (I) to *m-nitrobenzoyltrimethylene* $NO_2.C_6H_4.CO.C_3H_5$ (1,3), m. 77°; yields upon oxidation *m*-nitro-BzOH, and is reduced by Sn + HCl to an amine the hydrochloride of which m. 97–8°, and gives a diazo compd. which copulates with naphthols to crimson dyes. Na in alc. reduces (*a*) to an *amine* (II); b_{749} 234.7–5°; d_0^0 0.9996; d_0^{20} 0.9843; n_D 1.5353; *hydrochloride* $C_{10}H_{11}NH_2Cl$, m. 220–1°; *chloroplatinate* $(C_{10}H_{11}NH_2Cl)_2PtCl_4$, m. 177°; *thiourea deriv.*, $C_{10}H_{11}NH.CS.NHPh$; m. 124°. Upon oxidation of (II) with $KMnO_4$ (I) is regenerated. By the action of MeMgI on (I) *cyclopropylmethylphenylcarbinol* (III)

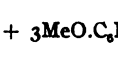
(III)

(IV)

was obtained; thick colorless and almost odorless liquid; b_{51} 151–2°; b_{761} 241–2°; d_0^{20} 1.0316; n_D 1.535; is not affected by Br or $KMnO_4$. It is converted by b. Ac_2O into a *hydrocarbon* (IV); b_{755} 211–3°; d_0^{19} 0.9553; n_D 1.5497; gives with a drop of conc. H_2SO_4 a golden yellow ppt. which dissolves in alc. with the color of neutral litmus.

H. M. Gordin.

3-Methoxybenzohydro-γ-pyrone. A. E. Chichibabin and I. V. Nikitin. Imper. Techn. School. *J. Russ. Phys. Chem. Soc.*, 43, 1185–9.—*This compound*, (I), is of interest because of the possibility it ought to offer for passing to derivs. of the 2 formulas proposed for brasilin (*Ber.*, 35, 1674; *Monatsh.*, 25, 743; *C. A.*, 2, 109, 1562, 1968). After an unsuccessful attempt to make it by starting with the reaction between Na monomethylresorcinolate (II) and Et β-iodopropionate, it was made by first treating (II) with Na β-iodopropionate, which yields the *m*-methoxyphenyl ether of Na β-hydroxypropionate (III) and then treating the *acid* underlying (III) with P_2O_5: *m*-$MeO.C_6H_4.ONa$ (II) + $I(CH_2)_2CO_2Na$ = NaI + *m*-$MeO.C_6H_4.O.(CH_2)_2CO_2Na$ (III)

m-$MeO.C_6H_4.O.(CH_2)_2CO_2H$ (IV) = H_2O + 3$MeO.C_6H_4$  (I). The *acid*

(IV), obtained with a yield of 8–10%, m. 82.5°; *silver salt*, $C_{10}H_{11}AgO_4$, cryst., little affected by light. (I) forms colorless prisms, m. 55°. H. M. Gordin.

Investigation of Naphthenic Acids. I. Petrov. Techn. Lab., Univ. St. Vladimir. *J. Russ. Phys. Chem. Soc.*, 43, 1198–1201.—The crude acids from Baku petroleum were converted into Me esters and fractionated. The 1st fraction (I) b_{748} 161–3°, the 2nd (II) b_{748} 169–71°, the 3rd (III) b_{736} 177–8°, the 4th b. 190° and the 5th 200°. The acid obtained by sapon. (I) corresponds to heptanaphthenic acid (*Ibid.*, 31, 241), and that from (II) to 1,2-methylpentamethylenecarboxylic acid (*Ber.*, 21, 741). Analysis of (III) points to the formula $C_7H_{13}CO_2Me$; d_0^0 0.9455; $d_{21.7}^{21.7}$ 0.9295; n_D 1.43005. (III) was converted into an *alcohol* $C_8H_{16}OH$; thick colorless liquid of an apple odor b_{744} 183–4°; b_{35} 103–4°; d_0^0 0.8943; $d_{23.6}^{23.6}$ 0.8808; n_D 1.44541. From this alc. an impure *naphthylene* was obtained; b. 108°, has odor of unsatd. compds., decolorizes $KMnO_4$. By the action of conc. NH_3 on (III) at 150° an impure *amide* was obtained (m. 138–40°) which consisted of 2 *compounds*, one m. 117°, the other 160°. H. M. Gordin.

Dehydrogenation by Catalysis. N. Zelinskii. Univ. Moscow. *J. Russ. Phys. Chem. Soc.*, 43, 1220–2.—Hexamethylene hydrocarbons are easily dehydrogenated by passing them over Pd black at 300° without the intermediate formation of tetra- and dihydro compds. The dehydrogenation begins above 200° and takes place even in presence of an excess of H, while below this temp. the reverse reaction of reduction

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of C_6H_6 takes place. The equil. seems to be at 200°. Pentamethylene and methylpentamethylene are not dehydrogenated by Pd even at 300°. Pt black acts like Pd, while Cu, Ag and Mg are inactive. H. M. GORDIN.

Selective Catalysis. New Tetrahydrobenzene. N. D. ZELINSKII. Univ. Moscow. *J. Russ. Phys. Chem. Soc.*, 43, 1222–4.—The dehydrogenation of tetrahydrobenzene, (I) by Pd black goes faster and more energetically than that of $(CH_2)_6$ (preceding abst.). On comparing the results obtained with (I) of the same b. p., but procured from 2 different sources, they were found to differ: (I) obtained by the action of $(CO_2H)_2$ on cyclohexanol was quickly and completely dehydrogenated to C_6H_6, while with (I) prepd. by the interaction of quinoline and iodocyclohexane the dehydrogenation could not be carried to completion, and the reaction product consisted of a mixture of C_6H_6 and a new "*tetrahydrobenzene*," C_6H_{10}; b. 77.5–8°; does not solidify even at —18°; has a fatty-aromatic odor, does not add Br and is perfectly indifferent to $KMnO_4$. This compd. must be present in the (I) prepd. by the 2nd method, and to it must be ascribed the selective absorption spectrum given by this (I), while the (I) obtained by the 1st method shows compact absorption. The Pd seems to exercize selective catalysis in not dehydrogenating the new "tetrahydrobenzene." The new compd. is probably the simplest representative of a bicyclic hydrocarbon in the $(CH_2)_6$ series. H. M. GORDIN.

Alcoholysis of some Alcohol and Phenol Esters. A. HALLER AND BÉCHAMPS. Paris. *Chem. Ztg.*, 34, 1098.—Borneol acetate and borneol benzoate with MeOH and 1.5% HCl gave borneol and the Me ester practically quant. When phenyl formate, acetate, benzoate, salicylate, β-naphthol salicylate and phenyl acetylsalicylate were similarly treated, the first 3 gave PhOH quant., and the next 2 gave PhOH and β-naphthol after b. 15 hrs. The last gave some salicylic acid because alcoholysis was more rapid than ester formation. E. J. WITZEMANN.

Solubility of β-Naphtholpicrate. W. J. MÜLLER. *Chem. Ztg.*, 34, 1101.—The solubility of this compd. in H_2O and 0.02 *N* HCl agrees with the law of mass action. E. J. WITZEMANN.

Compounds which Cause the Red Coloration of Aniline. II. The Effect of Sunlight in the Absence of Oxygen and Oxidizing Influences and a Comparison with the Behavior of Monomethyl- and Dimethylaniline. H. D. GIBBS. Bur. of Sci., Manila. *Philipp. J. Sci.*, *A*, 5, 419–39.—$PhNH_2$, purified in several ways and sealed in an indifferent gas, or *in vacuo*, becomes colored in sunlight. The products of the reaction are azophenine (which causes the red coloration), C_6H_6 and NH_3. The pressure of the gas influences the reaction. CO_2 retards the rate of coloration. MeNHPh in H gives an intense coloration; $MeNH_2$ was found among the products. Me_2NPh showed only a slight change after 60 days' insolation. Former work (*C. A.*, 4, 439, 2438) showing that fixation of labil H reduces the sensibility of compds. of chem. change by light catalysis is supported by the behavior of these 3 compds. E. J. W.

Anomaly of the Molecular Refraction in the Substituted Glyoxime Series. L. CHUGAEV AND P. KOCH. *Compt. rend.*, 153, 259–61.—The mol. refraction of disubstituted dioximes exhibits an abnormally high value when the 2 NOH groups are in the α-position. If the substituents are aliphatic the increase amounts to 1.3, if aromatic it is much greater. With the NOH groups in the β- or γ-positions the abnormality vanishes. This behavior is similar to that of other conjugate double linkings. R. F. JACKSON.

Hexosephosphoric Acid Ester. II. A. v. LEBEDEV. Inst. Pasteur, Paris. *Biochem. Z.*, 36, 248–60; cf. *C. A.*, 5, 674.—The Ph hydrazone of the ester was decomposed with CH_2O purified as the Ca salt. This showed the comp. $C_6H_{10}O_4(CaPO_4)_2$, showing

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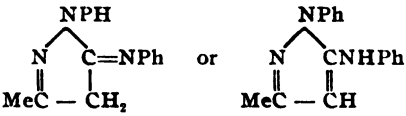
that the ester contains 2 PO_4 groups. The *p-bromophenylhydrazone*, m. 131° (decomp.). In the hydrazone, $C_{24}H_{22}O_{11}N_6Br_2P_2$, 1 mol. bromophenylhydrazine is combined, salt-like, with each of the 2 H_2PO_4 groups. The *sodium salt* $C_{18}H_{22}N_4O_7PNa_2$ of the *osazone* was crystallized by diluting its aq. soln. with alc. and the *lead salt* $C_{18}H_{21}N_4O_7PPb$ was prepared by pptg. the Na salt with $Pb(OAc)_2$. The comp. of the bromohydrazone and the osazone salts proves definitly that the ester is the diphosphoric acid ester of a hexose, and not the mono ester of a triose. D. D. VAN SLYKE.

New Reaction Catalyzed by Finely Divided Nickel. H. VAN BERESTEYN. Univ. Brussels. *Bull. soc. chim. belg.*, **25**, 293–300.—In preparing heptylic alc. from *N* heptylic aldehyde by the reducing action of H in presence of finely divided Ni α-hexylene is formed; the greatest yield at about 220°. It is assumed that heptylic alc. dissociates into α-hexylene and MeOH. The latter is then decomp. into CO and H. H. S. PAINE.

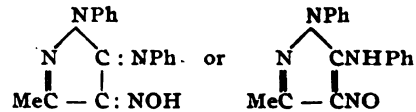
New Method of Preparing Diazoamino Compounds and a New Reaction with Nitrous Acid. WILHELM VAUBEL. Darmstadt. *Chem. Ztg.*, **35**, 1238.—Mineral salts of aromatic amines react directly with nitrites forming diazoaminobenzene. $PhNH_2.HCl + NaNO_2$ in H_2O produces first a green, then a yellow coloration with a sepn. of diazoaminobenzene as a brown ppt. The yield is greatest when 1 mol. of $PhNH_2.HCl$ and 0.5 mol. of $NaNO_2$ are taken. The reaction depends on the acid property of the amino salt. $OHNH_2.HCl + NaNO_2$ yields corresponding derivatives. When the nitrite is added in solid form to an alc. soln. of the aromatic amino salt, with gentle warming, other products are formed together with the diazoamino deriv. When both the nitrite and the salt are mixed together in solid form, a violent reaction occurs forming diazoaminobenzene and a series of other products. The reaction is retarded when a mixture of amino derivs. are used, as when $PhNH_2.HCl$ and paratoluidine-HCl react with $NaNO_2$. The above reactions may be applied for the detection of nitrites in H_2O. When $PhNH_2.HCl$ is added to H_2O containing nitrites, a turbidity or yellow coloration is produced, depending on the nitrite content of the H_2O. Nitrites in water to the extent of 0.00035% can be detected in this way.
D. BREESE JONES.

The Photochemical Synthesis of Carbohydrates through the Agency of Chlorophyll. CARLOS R. HAMAKERS. *Rev. ind. agr. Tucuman*, **2**, 209–11.—Review of some recent literature on the photosynthesis of sugars. G. A. ROUSH.

5-Aminopyrazoles and Iminopyrines. I. Substituted 5-Iminopyrazolones and 5-Aminopyrazoles. II. Substituted Iminopyrines. A. MICHAELIS. *Ann.*, **385**, 1–102.—*1-Phenyl-3-methyl-5-anilopyrazolone* or *1-phenyl-3-methyl-5-anilinopyrazole* (I) is



(I)



(II)

prepared by b. antipyrine chloride with $PhNH_2$. Needles from dil. EtOH, m. 120°, b. 365–6°. Reduces ammoniacal Ag soln. but not Fehling's. *Hydrochloride*, cryst. powder, m. about 118°. If prepared in dil. HCl, it contains 3 H_2O, needles, m. 67°. *Chloroplatinate*, $(C_{16}H_{15}N_3.HCl)_2PtCl_4.5H_2O$, yellowish red needles from dil. alc. + HCl, m. 135°. *Hydriodide*, long leaves from alc. + Et_2O, m. 110°. *Nitrate*, fine needles from alc., m. 150°. *Acid sulfate*, long needles, m. 153°. *Methiodide*, m. 174°, identical with the hydriodide described (*Ber.*, **36**, 3276). *1-Phenyl-3-methyl-4-isonitroso-5-anilopyrazolone* (II) from phenylmethylanilinopyrazolone and $NaNO_2$. Deep green needles, m. 168°. Alc. soln. deep red by transmitted light but green by reflected

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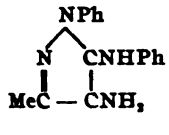
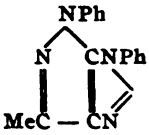
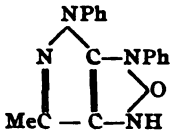
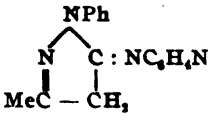
light. Salts easily decomp. *Hydrochloride*, yellow needles. *1-Phenyl-3-methyl-4-amino-5-anilinopyrazole* (III) from the nitroso comp. by reduction with Sn + HCl


(III)


(IV)


(V)


(VI)

or with Na_2SO_3. White needles, from $CHCl_3$ + ligroin, m. 140–1°. The moist base turns light red in the air. *Hydrochloride*, fine glistening scales, m. 240°. *Phenyl urea*, small white crystals, m. 220°. *Phenylthiourea*, cryst. powder from C_6H_6 + petroleum ether, m. 160°. *1-Phenyl-3-methyl-4,5-aziminopyrazole* (IV) from the amino comp. + $NaNO_2$. Needles, from ligroin, m. 152°. *Phenylmethyl-4-acetylamino-5-anilinopyrazole*, prisms from dil. AcOH, decomp. 130°. Contains 1 H_2O. *1-Phenyl-3-methyl-4,5-pyrazophenylhydrofurazane* (V), isomeric with the nitroso comp., is obtained when the nitrite soln. in dil. HCl is warmed till the red color disappears. Fine yellow needles from alc., m. 157°. *1-Phenyl-3-methyl-5-nitroanilopyrazolone* (VI) from 2,5-nitranilopyrine which loses MeI on heating. Yellow needles. *p-Compound* from C_6H_6 + petroleum ether, m. 153°; *m*-compd. m. 138°. *1-p-Bromophenyl-3-methyl-5-anilopyrazolone* is obtained by distilling *p*-bromoanilopyrine hydrochloride at 11 mm. Colorless needles from alc., m. 106°. Analogous *chloro derivative*, m. 94°. *1-Phenyl-3-methyl-5-p-bromoanilopyrazolone*, similarly prepared from 2,5-*p*-bromoanilopyrine. Crystals from dil. alc., m. 136°. The *5-chloroanilinopyrazolone*, needles m. 139°. *1-Bromophenyl-3-methyl-4-bromc-5-bromoanilopyrazolone*, fine needles, m. 131°. *1-Phenyl-3-methyl-4-benzylidene-5-anilopyrazolone*, yellow prisms from alc., m. 164°. Solns. show blue fluorescence. *1-Phenyl-3-methyl-4-anisylidene-5-anilopyrazolone*, yellow needles, m. 295°. Solns. blue fluorescent. *1-Phenyl-3-methyl-5-methylanilopyrazole* (*Ber.*, 36, 3277) yields a green nitroso compound which on reduction with Sn + HCl or Zn + AcOH gives *1-phenyl-3-methyl-4-amino-5-methylanilinopyrazole*, large needles from H_2O, m. 85°. *Hydrochloride*, leaves, m. 197°. *Benzylidene compound*, $C_{17}H_{16}N_3.N:CHPh$, hard yellow crystals, m. 101°. *o-Oxybenzylidene* compound, greenish yellow columns from alc., m. 133°. *Cinnamylidene compound*, deep yellow hard crystals, m. 114°. *Benzoylaminopseudoanilopyrine*, $C_{17}H_{16}N_3.NHCOPh$, white needles, m. 167°. *Urea*, $C_{17}H_{16}N_3.NHCONH_2$, cryst. powder, m. 193°. *Diazonium chloride*, cryst. mass. This gives a dye with β-naphthol, deep red leaves, m. 173°. *1-Phenyl-3-methyl-4-amino-5-ethylanilinopyrazole*, glistening leaves from H_2O, m. 129.5°. *Hydrochloride*, soft white needles, m. 220°. *Benzoyl compound*, white needles, m. 208°. *1-Phenyl-3-methyl-5-acetylanilinopyrazole*, white needles from ligroin, m. 96°. *1-Phenyl-3-methyl-5-methylnitroanilinopyrazole*, compact yellow crystals, *p-compound*, m. 174°, *m-compound*, m. 125°. The corresponding *5-methyl-p-bromo compound*, m. 84°, and the *p-chloro compound*, m. 61°. The isomeric *1-p-bromphenyl-3-methyl-5-anilinopyrazole*, m. 120°, and the *chloro compound*, m. 126°. *1-Phenyl-5-anilopyrazolone* is prepared by heating 1-phenyl-5-chloropyrazole with $PhNH_2$ at 200°. White prisms, m. 138°. *Isonitroso compound*, green crystals, m. 113°. *Methiodide*, identical with hydriodide of phenyl-2-methyl-2,5-anilopyrazole (see below). *Ethiodide*, colorless leaves from H_2O, m. 149°. *n-Propiodide*, m. 165°. *1-Phenyl-5-methylanilinopyrazole*, prisms from alc., m. 51°. *4-Nitroso compound*, dark green crystals, m. 99°. *1-Phenyl-3-methyl-5-toluidopyrazolones* were obtained by heating the hydriodides of the 1-phenyl-2,5-tolylaminopyrines. *p-Compound*, white leaves, m. 109°. *o-Compound*, fine silky needles, m. 72°. *1-Phenyl-3-methyl-4-isonitroso-5-p-toluidopyrazolone*, deep green leaves from alc., m. 117°. *Hydrochloride*, m. 152°. *1-Phenyl-3-methyl-4-amino-5-*

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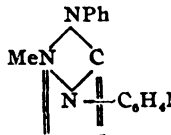
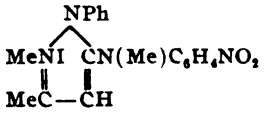
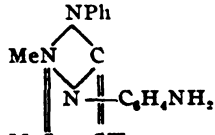
toluidinopyrazole, needles from ligroin, m. 131°. *Hydrochloride*, scales, m. 241–2°. *Azimino compound*, needles, m. 111–2°. *Acetate*, leaves, m. 193°. *1-Phenyl-3-methylpyrazo-4,5-p-tolyldihydrofurazane*, yellow felted needles from alc., m. 176°. 1-Phenyl-3-methyl-5-nitrotoluidopyrazolone (already prepared by Gunkel), long scarlet needles, m. 97°. *1-Phenyl-3-methyl-4-benzylidene-5-p-toluidopyrazolone*, yellowish prisms, m. 163°. *Anisylidene compound*, yellow needles, m. 184°. *1-Tolyl-3-methyl-5-anilopyrazolones* were obtained by distilling the hydriodides of the corresponding tolylanilopyrines at 12 mm. *p-Compound*, white needles from ligroin, m. 106°. *o-Compound*, needles from alc., m. 131°. *1-Tolyl-3-methyl-5-methylanilinopyrazoles: p-compound*, prisms from alc., m. 96°; *o-compound*, prisms, m. 67°. *Hydrochloride* (*p*) cryst., m. 133.5°. *Chloroplatinate*, needles, m. 189°. *p-Tolyl-3-methyl-5-acetylanilinopyrazole*, hard needles from ligroin, m. 84°. Corresponding *benzoyl compound*, leaves, m. 114°. (II). *1-Phenyl-5-chloropyrazole-3-carboxylic acid* was prepared by heating 1-phenyl-5-pyrazolone-3-carboxylic ester with two parts $POCl_3$ in sealed tube at 160–70°. Felted needles, m. 158°. *Barium salt*, leaves from H_2O, with 2 H_2O. *Ethyl ester*, leaves from petroleum ether, m. 46°. *Acid chloride*, needles from petroleum ether, m. 96°. *1-Phenyl-4,5-dichloropyrazole-3-carboxylic acid*, prisms from dil. alc., m. 214°. *1-Phenyl-4-bromo-5-chloropyrazole-3-carboxylic acid*, needles, m. 222°. *1-Phenyl-5-chloropyrazole*, prepared by heating phenyl-5-pyrazolone with 4 mol. $POCl_3$ 8 hrs. at 140–50°, colorless liquid, b. 250°. *1-Phenyl-4-bromo-5-chloropyrazole*, prisms, m. 65°. *1-Phenyl-4,5-dichloropyrazole*, prepared only by the action of PCl_5 5 hrs. at 150–60° on the monochloropyrazole, prisms from dil. alc., m. 48°. *1-Phenyl-3,4,5-trichloropyrazole*, not obtainable from the 4,5-dichloro- but from the 3,5-dichloropyrazole, silky needles, m. 82°, sublimable. *1-Phenyl-3,5-chloro-4-bromopyrazole*, transparent prisms, m. 85°. *1-Phenyl-3,5-dibromopyrazole*, from 1-phenyl-3,5-pyrazolidone and $POBr_3$, leaves from abs. alc., m. 50°. *1-Phenyl-3,4,5-tribromopyrazole*, long needles, m. 122°. 1-Phenyl-5-chloropyrazole. *Methiodide*, needles from H_2O, m. 161° (decomp.). *Methyl chloride*, tables, m. 147°. *Chloroplatinate*, red-yellow crystals from alc. + HCl, m. 207°. *Picrate*, needles from H_2O, m. 106°. *Ethiodide*, needles, m. 209°. *Ethyl chloride*, m. 181°. *Chloroplatinate*, m. 217°. *Propiodide*, prisms, m. 156° (decomp.). *1-Phenyl-2-methyl-2,5-anilopyrazole*, monoclinic crystals from alc., m. 128°. *Hydrochloride*, cryst. *Chloroplatinate*, leaves, m. 177°. *Hydriodide*, long needles from H_2O, m. 261°. *Thiocyanate*, leaves, m. 137°. *Picrate*, needles, m. 104°. *Methiodide*, crystals from H_2O, m. 124–5°. *Ethiodide*, m. 146°. *Benzoyliodide*, red-yellow quadratic tables, m. 108°. *1-Phenyl-2-ethyl-2,5-anilopyrazole*, prisms, m. 155°. *Chloroplatinate*, m. 197°. *Hydriodide*, m. 149°. *Picrate*, m. 172°. *Methiodide*, leaves, m. 119°. *1-Phenyl-2-n-propyl-2,5-anilopyrazole*, crystals, m. 124.5°. *Chloroplatinate*, m. 195°. *Hydriodide*, m 165°. *2,5-m-Nitroanilopyrine* (VII), prepared by action of 1 mol. antipyrine chloride on 2 mols. *m*-nitroaniline, 3



(VII)



(VIII)



(IX)

hrs. at 130–5°, garnet-red prisms, m. 114°. Reddens litmus strongly. *Chloroplatinate*, silky red needles from alc. + HCl, m. 204° (decomp.). *Hydriodide*, pale yellow crystals, m. 164°. Methiodide (VIII), thick needles from H_2O, m. 144°. *Iodoacetate*, crystals from alc., m. 196° (decomp.). *Iodobenzoate*, m. 178°. *2,5-p-Nitroanilopyrine*, deep red crystals with a green scheen, m. 129°. *Chloroplatinate*, brownish red crystals,

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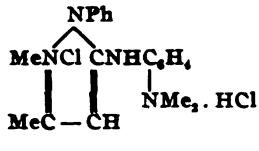
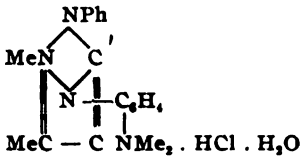
m. 217°. *Hydriodide*, thick needles, m. 198° (decomp.). *Methiodide*, hard crystals, m. 194° (decomp.). *2,5-Nitrotoluidopyrine*, red crystals, m. 100°. *Chloroplatinate*, needles, m. 131°. *Picrate*, small granular crystals, m. 145°. *2,5-m-Aminoanilopyrine* (IX), by reduction of the nitro compd. with Sn + HCl, is not pure. Better obtained by condensation of monoacetylphenylenediamine with antipyrine chloride. Small needles, m. 45–50°. *Hydrochloride*, needles, decomp. about 260°. *Chloroplatinate*, prisms, decomp. above 227°. *2,5-m-Acetylaminoanilopyrine*, large clear crystals from alc., m. 212°. Blues red litmus. *2,5-Benzoylaminoanilopyrine*, prisms from dil. alc., m. 172°. *Iodobenzoate*, crystals, m. 218°. *Hydrochloride*, prisms, m. 222°. Urea and thiourea derivs. unstable. *2,5-p-Aminoanilopyrine* needles, m. 112°. *Hydrochloride*, small crystals, m. 245°. *2,5-p-Acetylaminoanilopyrine*, m. 196°. *Hydriodide*, long needles from H_2O, m. 151°. *2,5-p-Dimethylaminoanilopyrine*, hard yellowish green prisms from ligroin, m. 120°. Strong base, absorbing CO_2 from the air. Forms two series of salts. *Dihydrochloride* (X), needles from alc. + Et_2O, m. 224°. *Dihydriodide*,

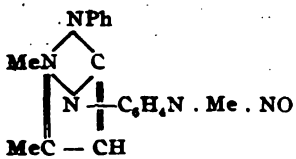


(X)

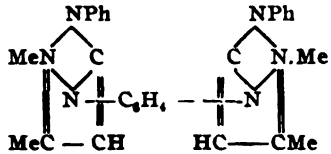


(XI)

large hexagonal plates, m. 208°. *Monohydrochloride* (XI), greenish crystals, m. 116°. *Monohydriodide*, greenish crystals, m. 72–3°. *Dimethiodide*, small needles from alc. + Et_2O, m. 205°. *Monomethiodide*, cryst. powder, m. 153°. *Nitrosamine* (XII), orange-

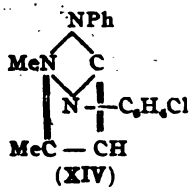


(XII)



(XIII)

yellow leaves from alc., m. 169°. *2,5-Monomethylaminoanilopyrine*, by reduction of nitrosamine with $SnCl_2$, sulfur yellow needles, m. 143°. *Hydrochloride*, hygroscopic needles. *Acetate*, needles, m. 142°. *Nitrosamine* of 2,5-methylamino-4-nitroanilopyrine, dark red needles from alc., m. 164°. *Hydriodide*, brown-red needles from H_2O, m. 192°. *m-Phenylenediiminopyrine* (XIII), small yellowish white crystals from toluene, m. 204°. *Chloroplatinate*, cryst. powder, decomp. about 300°. *Hydriodide*, leaves with 4 H_2O, m. 203°. *Methiodide*, m. 154°. *2,5-p-Chloroanilopyrine* (XIV),



(XIV)

pale yellow prisms from ligroin, m. 78°. *Hydrochloride*, hygroscopic powder. *Chloroplatinate*, dark red prisms, decomp. 89°. *Hydriodide*, large crystals, m. 180°. *Picrate*, needles, m. 147°. *Methiodide*, m. 192°. *Ethiodide*, m. 172°. *Iodobenzoate*, m. 183°. *2,5-as-o-Dichloroanilopyrine*, not obtainable in pure condition. *Picrate*, prisms, m. 152°. *Methiodide*, needles, m. 191°. *2,5-Bromoanilopyrine*, *p-compound*, compact

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crystals, m. 81°; *m-compound*, derivs. only analyzed. *Chloroplatinates*, *p-compound*, prisms with 5 H_2O, m. 115°; *m-compound*, m. 211°. *Hydriodides*, *p-compound*, needles from H_2O, m. 206°; *m-compound*, m. 205°. *Picrates*, needles, *p-*, m. 159°; *m-*, m. 190°. *Methiodides*, prisms, *p-*, m. 193°, *m-*, m. 133°. *Ethiodides*, *p-*, m. 176°, *m-*, m. 118°. *1-p-Chloroanilopyrine*. *p*-Chlorophenylhydrazine and acetoacetic ester in 50% AcOH at 100° gave *p-chlorophenyl-3-methyl-5-pyrazolone*, fine needles from alc., m. 172° which with $POCl_3$ at 150° yielded the 5-chloropyrazole. Its *methiodide*, fine needles from H_2O, m. 233° (decomp.), heated with $PhNH_2$ gave *1-p-chloroanilopyrine*, clear yellow needles, m. 96°. *Hydrochloride*, m. 200°. *Chloroplatinate*, prisms, m. 199°. *Hydriodide*, needles, m. 189°. *Picrate*, needles, 192°. *Methiodide*, large transparent plates, with 1 H_2O, m. 70°, anhydrous, m. 159°. *Methyl chloride* m. 155°. *1-p-Bromoanilopyrine*, large pale reddish yellow crystals, m. 119°. *Hydrochloride*, hygroscopic cryst. powder, m. 202–3°. *Chloroplatinate*, decomp. 202°. *Chloroaurate*, dark red needles, m. 166°. *Hydriodide*, needles, m. 176°. *Picrate*, needles, m. 193°. *Methiodide*, needles with 1 H_2O, m. 101°, anhydrous, m. 158°. *Methyl chloride*, m. 157°. *1-Phenyl-2,5-tolyliminopyrines*, *p-compound*, leaves, m. 106°, *o-*, scales, m. 69°. *Hydrochloride* (*p*) hygroscopic cryst. powder, m. 207°. *Chloroplatinate*, needles, m. 138°. *Hydriodides*, *p-*, prisms, m. 166°, *o-*, leaves, m. 157°. *Picrate* (*p*), needles, m. 144°. *Methiodides*, *p-*, needles, m. 187°, *o-*, m. 192°. *Iodoacetate* (*p*), m. 166°. *Iodobenzoate* (*p*), m. 297°. *p-* and *o-Tolylanilopyrines*, *p-*, yellowish crystals, m. 106°, *o-*, white needles, m. 129°. *Hydriodides*, *p-*, leaves, m. 165.5°, *o-*, needles, m. 196°. *Picrate* (*p*), needles, m. 169°. *Methiodides*, *p-*, prisms, m. 175°, *o-*, needles, m. 167°. *Iodobenzoate* (*p*), m. 147°. *Iodoacetate* (*p*), m. 206°.

ALVIN S. WHEELER.

Thermochemical Investigations. IV. Heat of Combustion of Terpenes and Styrenes and the Calculated Heat of Combustion. K. AUWERS, W. A. ROTH AND F. EISENLOHR. Chem. Inst., Univ. Greifswald. *Ann.*, **385**, 102–16; cf. *C. A.*, **4**, 2143.—Owing to incomplete combustion in the former detns., some of them have been repeated and it is shown that the values must be increased on the average 0.5%. The heat of combustion in kg.-cal. per mol. follows immediately the name of the compd. The factor, 4.189, converts this in each case into kg.-Joules per mol. *d*-Limonene, 1470.9. Average of 3 samples: I. b_{758} 177.6–177.8°; II. b_{758} 177.4–177.8°; III. b_{764} 177.0–177.8°. *d,α*-Pinene, 1478.4. I. b_{778} 157–8°; II. b_{753} 155–5.2°. Styrene, 1046.1. I. and II. b_{23} 48.4°. *α*-Methylstyrene, 1203.1. I. $b_{21.5}$ 66°; II. b_{20} 65°. *α,β*-Dimethylstyrene, 1352.8. I. b_{19} 85.5–6.5°; II. b_{19} 83–4°; b_{20} 91°. Phenyl-1-butene-2, 1361.4. I. b_{16} 76–77.5°; II. b_{21} 81–2°. Diphenyl-1,4-ethyl-1-butene-4, 2372.6. I. b_{20} 217–9°; II. b. not detd. The paper concludes with a discussion of Lemoult's theories and detns.

ALVIN S. WHEELER.

New Compounds of the Choline Type. G. A. MENGE. Hyg. Lab., Pub. Health and Mar. Hosp. Serv. *J. Wash. Acad. Sci.*, **1**, 223–4.—*α-Methylcholine*, $Me_3NClCHMeCH_2OH$, *β-dimethylcholine*, $Me_3NClCH_2CMe_2OH$, and *β-methyl-β-ethylcholine* have been prepared by condensing NMe_3 with the chlorohydrins of methylethylene, dimethylglycol and methylethylglycol, resp. They are cryst., very hygroscopic compds. Various derivs. of the 1st have also been made.

CHAS. A. ROUILLER.

Lactarinic Acid. J. BOUGAULT AND C. CHARAUX. *Compt. rend.*, **153**, 880–1; cf. *C. A.*, **6**, 262.—The oxime of lactarinic acid gives, with conc. H_2SO_4 on the H_2O bath, a mixt. of $Me(CH_2)_{11}NHCO(CH_2)_4CO_2H$ and $Me(CH_2)_{11}CONH(CH_2)_4CO_2H$. These were not isolated, but when hydrolyzed with conc. HCl at 170–80°, they yielded $(CH_2CH_2CO_2H)_2$, *n*-$C_{12}H_{25}CO_2H$, *n*-$C_{12}H_{25}NH_2$ and $H_2N(CH_2)_4CO_2H$ (the last in too small

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amt. to permit of its identification). Lactarinic acid is therefore 6-ketostearic acid, $Me(CH_2)_{11}CO(CH_2)_4CO_2H$. CHAS. A. ROUILLER.

Catalytic Esterification, in the Wet Way, of Dibasic Acids. J. B. SENDERENS AND J. ABOULENC. *Compt. rend.*, 153, 881–4; cf. *C. A.*, 5, 3224, 3411.—Malonic acid, b. 1 hr. with 2 mols. EtOH, gives 32% ester, allowance being made for the decomp. of the acid into AcOH and CO_2 (8 cc. CO_2 evolved per min.); 1% of AcOEt is also formed. With 1–2% by vol. of H_2SO_4, the evolution of CO_2 was decreased to 0.5 cc. per min. and the yield of AcOEt decreased to 1/1600, that of $CH_2(CO_2Et)_2$ increased to 67.5%. More H_2SO_4 (10%) does not increase the yield of malonate. Anhydrous $Al_2(SO_4)_3$ and $KHSO_4$ give practically the same results as H_2SO_4. The yields of different esters (without catalyst) are as follows: Me, 28.5; Et, 32.6; Pr, 62.4; Me_2CHCH_2, 75.4; isoamyl, 85.6. Succinates: Et, 30; Pr, 75.5; isoamyl, 96.2. Oxalates: Et, 28; Me_2CHCH_2, 78; isoamyl, 97. To esterify *o*-phthalic acid, 15% H_2SO_4 must be used. CHAS. A. ROUILLER.

Reduction of Crotonic Aldehyde in the Presence of Nickel. ROGER DOURIS. École sup. pharm., Paris. *Bull. soc. chim.*, 9, 922–5.—At 170°, in the presence of reduced Ni, 38% PrCHO and 36% BuOH are obtained (15 g. MeCH : CHCHO used per hr.); at 125°, 48% PrCHO and 20% BuOH (20–2 g. aldehyde per hr.). *n-Butylidenediurethan*, $PrCH(NHCO_2Et)_2$, white needles in spherical, radiating aggregates, m. 130°. *n-Butyl phenylsulfocarbamate*, PhNHCSOBu, needles, m. 53°. In the reduction of the MeCH : CHCHO, there is also formed a small amt. of a *substance* b_{18} 115–9°, which is apparently an octyl alc. CHAS. A. ROUILLER.

Monomethyl- and Dimethyl-3,4-dihydroxybenzylamines. M. TIFFENEAU. *Bull. soc. chim.*, 9, 928–32; cf. *C. A.*, 5, 3803.—*Veratryl alcohol*, from the aldehyde and alc. KOH, b_{14} 169°, d_{16} 1.180. *Acetate*, b_{12} 170–5°. *Benzoate*, b_{12} 233–6°, m. 36–7°, d_0 1.203. *Phenylurethan*, m. 118°. *Chloride*, from the alc. and HCl in Et_2O, m. 48°; heated in a sealed tube with alc. NH_2Me, it gives *3,4-dimethoxybenzylmethylamine*, b_{12} 135–40°; *hydroiodide*, m. 170–1°. The dimethoxy compd., heated at 140–50° with 3–4 mols. conc. HI, gives *3,4-dihydroxybenzylmethylamine hydroiodide*, m. 179°; *hydrochloride*, m. 182°. *3,4-Dimethoxybenzyldimethylamine*, b_{12} 133–7°, b. 236–9°, d_0 1.0578; *hydroiodide*, m. 174°; *methiodide*, m. 179°. *3,4-Dihydroxybenzyldimethylamine hydrochloride*, m. 183°. *Methylenedioxybenzyldimethylamine*, from piperonyl chloride and $NHMe_2$, b_{12} 125°, d_0 1.101; *hydrochloride*, m. 223°; *hydroiodide*, m. 135°; *methiodide*, m. 233°. When the hydrochloride is heated on the H_2O bath with 2 mols. PCl_5, and decomp. with H_2O, the dihydroxy compd. described above is formed. C. A. R.

2,3- and 2,4-Dihydroxybenzylamines. RENÉ DOUETTEAU. Hôpital Boucicaut, lab. Tiffeneau. *Bull. soc. chim.*, 9, 932–8; cf. preceding abstr.—*2,3-Dimethoxybenzylamine*, obtained by reduction of *o*-veratral oxime by Na–Hg in a soln. slightly acid with AcOH, b_{11} 137°, d_0 1.1243; *hydrochloride*, m. 159°; *picrate*, golden yellow needles, m. 205°; *methiodide*, m. 174°. *2,3-Dimethoxybenzylacetamide*, made by heating the above amine with the calc. amt. of Ac_2O, m. 94°, b_{10} 210–1°; treated in b. xylene with Na, it gives a substance which, with MeI, forms the *compound* $(MeO)_2C_6H_3CH_2NMeAc$, b_{12} 202–5°, d_0 1.1506; it is unchanged by long heating with Ac_2O at 150–60°. HI at 130–40° converts the dimethoxy compd. into *2,3-dihydroxybenzylamine hydroiodide*, m. 149°; *hydrochloride*, m. 186°. *3,4-Dimethoxybenzylamine*, b_{12} 154–8°; *hydrochloride*, m. 257°; *methiodide*, m. 228°; *picrate*, m. 169°. *3,4-Dihydroxybenzylamine hydroiodide*, m. 205°; *hydrochloride*, m. 172°. CHAS. A. ROUILLER.

Reactivity of Aromatic Bromine Derivatives. II. Formation of some Entirely Aromatic Disulfides of the Types R. S. R'. S. R and R. S. R'. S. R". ED. BOURGEOIS AND A. FOUASSIN. Univ. Liège. *Bull. soc. chim.*, 9, 938–44; *Rec. trav. chim.*, 30,

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426–37.—When *p*-$C_6H_4Br_2$ is heated at 200–25° with the Pb salts of various aromatic mercaptans, mono- and disulfides are formed; as the heating is prolonged, the proportion of disulfide increases; the more complex the radical of the mercaptide, the greater the amt. of disulfide formed. Thus, the % of monosulfide formed when the mercaptides were heated with 1, 2.5 and 5 mols. $C_6H_4Br_2$, resp., for 6 hrs. at 225° was as follows: PhSH; 59, 84, 88. *p*-MeC_6H_4SH; 16, 50, 56. α-Thionaphthol; 13, 35, —. *p-Phenylenediphenyl disulfide*, $C_6H_4(SPh)_2$, white scales, m. 81.5°, b_{14} 265°. *p-Bromophenyl-p-cresyl sulfide*, pearly leaflets, m. 82.5°, b_{14} 200.5°. *p-Phenylenedi-p-cresyl disulfide*, prismatic needles, m. 99°, b_{14} 285°. *p-Bromophenyl-α-naphthyl sulfide*, prismatic needles, m. 73°, b. 247°. *p-Phenylenedi-α-naphthyl disulfide*, rhombic tables, m. 148.5°, b_{14} above 360° (decomp.). *p-Bromophenyl-β-naphthyl sulfide*, rhombic crystals, m. 114.5°, b_{14} 253°. *p-Phenylenedi-β-naphthyl disulfide*, m. 185°, b_{14} above 360° (decomp.). The bromo sulfides react easily with other Pb mercaptides; in this way was obtained *p-phenylenephenyl-p-cresyl disulfide*, $MeC_6H_4SC_6H_4SPh$, m. 55.5°, b_{14} 272°.

CHAS. A. ROUILLER.

Reactivity of Aromatic Bromine Derivatives. III. Action of Bromonitrobenzenes on Thiophenolates. ED. BOURGEOIS AND P. HUBER. Univ. Liège. *Bull. soc. chim.*, 9, 944–7.—While the Pb salt of PhSH reacts very slightly, even at 240°, with bromonitrobenzenes and gives no nitro sulfides at all, the Na salt reacts very easily in abs. alc., even in the cold, forming, with the *o*- and *p*-$BrC_6H_4NO_2$, the corresponding sulfides practically quant., while the *m*-compd. gives a little Ph_2S_3 and a red cryst. substance rich in N, m. about 122.5°, possibly $(m\text{-}BrC_6H_4N)_3$. *p-Nitrodiphenyl sulfide*, $PhSC_6H_4NO_2$, pale yellow, prismatic needles or hexagonal tables, m. 54.4°, b_{25} 240°, b_{50} 262.5°, b_{100} 288.2°. *o-Nitrodiphenyl sulfide*, pale orange crystals, m. 80.2°.

CHAS. A. ROUILLER.

Catalytic Preparation of Aromatic Ketones. J. B. SENDERENS. *Bull. soc. chim.*, 9, 948–52; cf. *C. A.*, 5, 1589, 1590.

C. A. R.

Decomposition of Quinocardin by the Enzymes in the Leaves of Panguin edule. A. W. K. DE JONG. *Rec. trav. chim.*, 30, 220–2.—At ordinary temp., the enzyme converts the quinocardin into glucose, HCN and a *diketone*, $C_6H_8O_4$, which yields a *diphenylhydrazone*, decomp. 177°. In a closed vessel, the amts. of HCN and of the diketone decrease proportionally as the reaction is prolonged, the HCN adding to the ketone.

CHAS. A. ROUILLER.

Some Secondary Aromatic Amines in Relation with Diisopropylamine. M. C. DE LEEUW. Lab. chim. org., univ. Leide. *Rec. trav. chim.*, 30, 239–69; cf. Van der Zande, *Ibid.*, 8, 202.—The following analogs of $NH(CHMe_2)_2$ were prepared by Hofmann's method, 2 mols. of an amine being generally heated 6–8 hrs. with 1 mol. of a halide at 100°. *α-Phenylethylisopropylamine*, from MeCHPhNH and Me_2CHI, b_{20} 92°, d_4^{14} 0.905, n_D^{14} 1.4996, solidifies in liquid air to a glassy mass which becomes liquid from —50° to —50°, then crystallizes and m. —26°. *Hydrochloride*, m. 235.5°; when treated with $NaNO_2$, it forms the *nitrite*, decomp. 122°, voluminous needles, which, when the soln. is warmed, dissolve and soon the *vitrosamine* seps. as a more or less reddish yellow liquid, b_{19} 161.5–2.5°, $d_4^{15.7}$ 1.034, $n_D^{15.7}$ 1.52657. With HCl it gives the hydrochloride described above. *Picrate*, yellow crystals, m. 157.5°. $NH(CHMePh)_2$.HCl, needles, m. 202–3° (Busch and Leefhelm, who made it in another way (*C. A.*, 2, 2230) give 240°). *Diphenylmethylisopropylamine*, b_{19} 173°, b_{35} 181.5–2.0°. d_4^{13} 1.001, n_D^{13} 1.56015, m. 11.5°. *Hydrochloride*, crystals with 1 H_2O, m. 213.5–4.0°, decomp. when evapd. in H_2O. *Nitrite* (from C_6H_6), cubes, m. 107°. *Nitrosamine*, faintly yellow crystals, m. 82.5°. *Acetyl derivative*, m. 89.5°. *Picrate*, light yellow silky needles with 1 C_6H_6, m. 189–90°. *Diphenylmethyl-α-phenylethylamine*, b_{19} 234.5–5.0°, $d_4^{18.6}$ 1.060, $n_D^{13.6}$ 1.59824. *Hydrochloride*, m. 232.5–4.0°, decomp. by H_2O. *Picrate*,

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yellow crystals with 1 C_6H_6, decomp. 184.5°. *Nitrosamine* (from abs. alc.), slightly yellow crystals, m. 80.5°. $NH(CHPh_2)_2$ (cf. Friedel and Balsohn, *Bull. soc. chim.*, [2] 33, 587), m. 143°; *hydrochloride*, from the base and HCl in dry Et_2O, m. 200–2°, very sensitive to H_2O. The nitrosamine could not be obtained. Picrate, m. 203.5° (decomp.). No picryl derivs. of these amines could be obtained with picryl chloride.

CHAS. A. ROUILLER.

Action of 4-Nitrosophenol, 2,6-Dibromo-4-nitrosophenol and 6-Nitrosocresol(3) with Bromine. H. VAN ERP. Harlem. *Rec. trav. chim.*, 30, 270–304.—From excess of Br and *p*-HOC_6H_4NO are obtained chiefly 2,4,6-$Br_3C_6H_2OH$, HNO_3 and HBr and, among the by-products, 4,6-dibromo-2-nitro- and 2,6-dibromo-4-nitrophenols, doubtless formed by the action of HNO_3 on the tribromo compd. That these last 2 compds. were formed directly and not by isomerization of 1 into the other was shown by treating each separately in AcOH with a large excess of $NaNO_2$; neither was appreciably affected. 2,6-Dibromo-4-nitrosophenol and 6-nitrosocresol similarly give, with excess of Br, 2,4,6-$Br_3C_6H_2OH$ and 2,4,6-tribromocresol(3) (the other products formed in these reactions were not investigated). 2,6-Dibromoquinone in small amt. and considerable resinous matter was also always obtained. All these substances were prepared in the purest possible state by the usual methods for purposes of comparison with the products obtained in these expts. 2,6-Dibromo-4-nitrosophenol, obtained from Br and HOC_6H_4NO (Fischer and Hepp, *Ber.*, 21, 674) is identical with the product obtained from 2,6-dibromoquinone and $NH_2OH.HCl$ (cf. Kehrmann, *Ber.*, 21, 3318). *2,4,6-Tribromocresyl(3) benzoate*, birefractive plates, rhombs or hexagons, m. 87°. *2,6-Dibromohydroquinone diacetate*, birefractive, tetrahedral prisms from alc., polyhedral crystals from Ac_2O, m. 116.5°; *dibenzoate*, oblong, rectangular plates from alc., m. 136.25°. *Dianilinobromoquinone*, $C_{18}H_{13}O_2N_2Br$, obtained from 2 mols. 2,6-dibromoquinone and 3 mols. $PhNH_2$ in alc., olive-colored microcryst. powder, contracts somewhat about 145° but does not m. up to 300°. CHAS. A. ROUILLER.

Simultaneous Formation of Isomeric Benzene Substitution Products. XVI. Quantitative Investigations on the Introduction of a Second Halogen Atom into Monohalogen Benzenes. A. F. HOLLEMAN AND T. VAN DER LINDEN. Lab. chim. org., univ. Amsterdam. *Rec. trav. chim.*, 30, 304–80.—The formation of products containing more than 2 ats. of halogen is avoided by using about $^1/_2$ of the amt. of halogen theoretically necessary for the formation of the dihalogen deriv.; after the reaction is complete, the excess of monohalogen deriv. is removed partly by fractional distillation and finally by treatment with H_2SO_4 of the proper conc. The relative proportions of the *o*-, *m*- and *p*-dihalogen derivs. in the product is detd. from the f. p. (*C. A.*, 5, 1911). CHLORINATION OF PhCl. Pure *o*-$C_6H_4Cl_2$, b_{14} 65.8°, b. 179°, f. —17.6°, n_{17} 1.5532. *m*-$C_6H_4Cl_2$, b_{90} 66°, b. 172–3°, f. —24.8°, n_{17} 1.5480. *p*-$C_6H_4Cl_2$, b. 173°, f. 52.6°. PhCl, b. 132°, n_{17} 1.5259. For the final sepn. of the PhCl from the dichloro compds., 95.2% H_2SO_4 is used. The chlorination was carried out at 60–5°. % of *p*-, *o*- and *m*-$C_6H_4Cl_2$, resp.: With 0.5% $AlCl_3$ as catalyst; 65.6–6.0, 29.4–30.0, 4.0–5.0. With $FeCl_3$; 54.0–5.8, 38.6–9.7, 4.8–5.6. That the *m*-compd. was actually formed was further shown by sulfonating the mixt. and isolating a sulfonamide identical with that obtained from the sulfonation product of pure *m*-$C_6H_4Cl_2$. CHLORINATION OF PhBr. Pure *o*-ClC_6H_4Br, b_{761} 199°, f. —12.1°, n_{15} 1.5836. *m*-ClC_6H_4Br, b. 193–4.5°, f. —21.4°, n_{15} 1.5795. *p*-ClC_6H_4Br, f. 64.6°. To remove the PhBr from the dihalogen products, 95% H_2SO_4 is used. PhBr, $b_{762.2}$ 153.8°, n_{17} 1.5610. % of *p*-, *o*- and *m*-ClC_6H_4Br in the products of chlorination at about 75°: With 1% $AlCl_3$; 57.2–64.6, 29.8–34.7, 5.4–8.1. With $FeCl_3$; 50.9–2.5, 41.5–2.0, 6.0–7.1. BROMINATION OF PhCl. Expts. carried out at 55°. % of *p*-, *o*- and *m*-ClC_6H_4Br: With metallic Al as catalyst; 74.9–6.2, 11.2–1.8, 12.6–3.3 (at 60–5°; 76.2–8.7, 15.0–5.3, 6.3–8.8). With Fe; 87.1–8.6,

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10.9–1.4, 1.2–1.7. BROMINATION OF PhBr. *p*-$C_6H_4Br_2$, f. 86.7°. *o*-$C_6H_4Br_2$, b. 221°, f. 6.7°, n_{17} 1.6120. *m*-$C_6H_4Br_2$, b. 217°, f. —6.8°, n_{17} 1.6086. Bromination carried out at about 55°. % of *p*-, *o*- and *m*-$C_6H_4Br_2$ in the product: With Al; 61.0–70.7, 8.3–10.4, 19.5–30.1. With Fe; 84.0–5.1, 13.1–3.7, 1.8–1.9. As the halogen benzenes are attacked by $AlCl_3$ and $AlBr_3$, the expts. with this metal as catalyst give only a rough approximation as to the amts. of the 3 isomers which would probably be formed without catalysts. PhCl, brominated 14 ds. at 55° without catalyst, then b. 2 ds., gave 81.3, 17.5 and 1.2% of *p*-, *o*- and *m*-ClC_6H_4Br, resp. In all of the above expts. the ratio *o* : *m* is nearly const. CHAS. A. ROUILLER.

Glycerol with Four Carbon Atoms. Passage to the Furfurane Series and to the Erythritols. HENRI PARISELLE. *Ann. chim. phys.*, **24**, 315–410.—Allylcarbinol, $CH_2 : CHCH_2CH_2OH$ (cf. Wagner, *Ber.*, **27**, 2437), is obtained in 18–25% yields by adding 120 g. allyl bromide in Et_2O to 24 g. Mg turnings and 30 g. trioxymethylene in Et_2O, heating on the H_2O bath 4–5 hrs., decomp. with H_2O, adding H_2SO_4 and extracting with Et_2O. Some biallyl and a substance b. 170–80° are also formed. The carbinol b. 113–4°, d_{17} 0.848, n_D^{17} 1.421. 1,2-Dibromo-4-butanol, b_{11} 112–4°, d_0 2.02, d_{15} 1.98, n_D^{15} 1.548; *phenylurethan*, m. 70–1°; *acetate*, b_{16} 135°, d_{18} 1.73, n_D^{19} 1.508. The allylcarbinol, treated with gaseous or conc. aq. HBr or with PBr_3, gives, with considerable $MeCHBrCH_2CH_2Br$, small amts. of *4-bromo-1,2-butene*, $CH_2 : CHCH_2CH_2Br$, b. 97–8°, d_0 1.355, d_{17} 1.33, n_D^{17} 1.465, which easily adds 2 ats. of Br or 1 mol. HBr; b. with 1 mol. KOH, it is slowly decomp. into $CH_2 : CHCH : CH_2$. The acetate $CH_2 : CHCH_2CH_2OAc$ (in the original the formula is given as $CH_2 : CHCH_2CH_2CO_2Me$.—ABSTR.) b. 125°, d_0 0.93, d_{15} 0.918, n_D^{15} 1.411, adding Br to form the compd. $CH_2BrCHBrCH_2CH_2OAc$, b_{16} 135°, d_{18} 1.73, n_D^{18} 1.508. The substance formed as a by-product in the prep. of allylcarbinol has the structure $CH_2(OCH_2CH_2CH : CH_2)_2$ and b. 175–7°, d_0 0.897, d_{14} 0.88, n_D^{14} 1.4333, adds 2 mols. of Br. Allylcarbinol methyl ether, $CH_2 : CHCH_2CH_2OMe$ (cf. Lespieau, *Compt. rend.*, **144**, 1161), b. 68–9°, d_0 0.817, d_{20} 0.8, n_D^{20} 1.398. By adding the allyl bromide and $MeOCH_2Cl$ to the Mg very slowly, shaking at frequent intervals, and heating 5–6 hrs. on the H_2O bath, the yield of bromide corresponding to the Me ether is increased to 60% and that of biallyl tetrabromide to 30%. The dibromide $CH_2BrCHBrCH_2CH_2OMe$ b_{16} 96°, d_0 1.817, n_D^{20} 1.5158. *Ethyl ether*, b. 90°, d_0 0.813, n_D^{17} 1.396; *dibromide*, b_{12} 98°, d_0 1.662, d_{20} 1.614, n_D^{20} 1.498. Treated with gaseous HBr, the Et ether gives almost exclusively $MeCHBrCH_2CH_2Br$ (cf. Demjanoff, *Ber.*, **28**, 21), b_{12} 64°, d_{20} 1.80, n_D^{20} 1.507, while with HOCl is obtained chiefly the *compound* $CH_2ClCH(OH)CH_2CH_2OEt$, b_{12} 88–90°, d_0 1.1138, n_D^{15} 1.45, together with small amts. of the compd. $HOCH_2CHClCH_2CH_2OEt$. *Allylphenylurethan*, $PhCHCO_2C_3H_5$, m. 70°. Allylcarbinol does not form a cryst. urethan. 1,2,4-Tribromobutane (cf. Lespieau and Pariselle, *Compt. rend.*, **146**, 1035), b_{12} 112°, d_0 2.276, d_{18} 2.234, n_D^{18} 1.574; heated · hrs. at 125° with 3 mols. of AcOK and Ac_2O, it gives $CH_2 : CBrCH_2CH_2OAc$ and the compd. $AcOCH_2CH(OAc)CH_2CH_2OAc$, b_{11} 150°, b_{17} 158°, d_0 1.152, d_{19} 1.13, n_D^{19} 1.436. The latter, when heated with $Ba(OH)_2$, yields the triol, b_{12} 179°, d_0 1.21, d_{20} 1.18, n_D^{20} 1.47; *triphenylurethan*, needles, m. 149–52°. $CH_2BrCHBrCH_2CH_2OMe$, heated 40 hrs. at 110° with H_2O, gives, together with the inner anhydride $C_4H_8O_2$ described below, the *compound* $HOCH_2CH(OH)CH_2CH_2OMe$, b_{12} 121°, d_0 1.11, n_D^{20} 1.448; *diphenylurethan*, needles, m. 111–2°. The *ethyl ether*, $HOCH_2CH(OH)CH_2CH_2OEt$, b_{14} 130°, d_0 1.08, n_D^{15} 1.45; *diphenylurethan*, m. 98–9°. The Me or Et compd., treated at 115° with HBr gas, gives *1,4-dibromo-2-butanol*, b_{12} 114–5°, d_0 2.023, d_{20} 1.96, n_D^{20} 1.544. *1-Chloro-4-bromo-2-butanol*, from $CH_2ClCH(OH)CH_2CH_2OEt$ and HBr, b_{12} 103–5°, d_0 1.69, n_D^{17} 1.52. *1,2,4-Butanetriol-1,4-diacetate*, formed as a secondary product in the reaction of KOAc on the compd.

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$CH_2.CHCH_2CH_2Br$ (see below), b_{18} 161–3°, d_0 1.17, d_{18} 1.15, n_D^{18} 1.446. The same
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epibromohydrin, heated 6 hrs. at 125° with $ZnCl_2$ in Ac_2O, gives the *compound* $AcOCH_2CH(OAc)CH_2CH_2Br$, b_{12-4} 140–1°, d_{20} 1.44, n_D^{20} 1.473. In the oxidation of allylcarbinol by $Ba(MnO_4)_2$, and subsequent distillation of the product, the hydrolysis by b. H_2O of the bromides of its Me and Et ethers or of $CH_2BrCHBrCH_2CH_2Br$, and the hydrolysis of $AcOCH_2CH(OAc)CH_2CH_2Br$ by $Ba(OH)_2$, there is formed a compd. $C_4H_8O_2$, b_{18} 81–2°, b. 181°, d_0 1.107, d_{18} 1.07, n_D^{18} 1.4478; *phenylurethan*, m. 120°. Treated with Br on the H_2O bath or with HBr, it slowly forms $CH_2BrCH(OH)CH_2CH_2Br$; b. H_2O does not attack it; with Ac_2O at 125° in the presence of a trace of $ZnCl_2$ it forms $AcOCH_2CH(OAc)CH_2CH_2OAc$. These facts show that it is *hydroxyhydrofurfurane*,
$CH_2CH(OH)CH_2CH_2O$. Its *bromide*, $CH_2CHBrCH_2CH_2O$, obtained by treating $CH_2BrCHBrCH_2CH_2OH$ in Et_2O with dry KOH, b. 150–1°; d_0 1.61, d_{12} 1.59, n_D^{12} 1.496; this, when heated with ½ its wt. of dry KOH, gives dihydrofurfurane, b. 67–9°, d. 0.945, n_D^{15} 1.44, which at once adds Br in $CHCl_3$ to form the dibromo deriv., b_{24} 97–9°, m. 10–1° (cf. Henninger, *Ann. chim. phys.*, [6] 7, 211). The *compound* $CH_2CHCH_2CH_2Br$, from $CH_2BrCH(OH)CH_2CH_2Br$ and KOH in Et_2O, b_{14} 58°, b. 160°,
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d_0 1.59, n_D^{20} 1.478; heated with slightly acidulated H_2O, it gives the hydroxyhydrofurfurane above and the $CH_2BrCH(OH)CH_2CH_2Br$ from which it is made; with Ac_2O it yields $AcOCH_2CH(OAc)CH_2CH_2Br$ (see above); with KOAc, it forms $AcOCH_2CH(OH)CH_2CH_2OAc$ and the compd. $CH_2CHCH_2CH_2OAc$ (see below); it does
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not react with $BzCHNaCO_2Et$, and with $CHNa(CO_2Et)_2$ it gives a small amt. of a *substance* b_{14} 160° which seems to be the compd. $CH_2CHCH_2CH_2CH(CO_2Et)_2$. The
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acetate $CH_2CHCH_2CH_2OAc$ (see above), b. 189–92°, d_{18} 1.12, n_D^{18} 1.446. The *ethyl*
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ether $CH_2CHCH_2CH_2OEt$, from $CH_2ClCH(OH)CH_2CH_2OEt$ and KOH in Et_2O, b.
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146–7°, d_0 0.957, d_{18} 0.934, n_D^{18} 1.415; HCl gas converts it back into the chlorohydrin from which it is made. For the sake of comparison, the b. p., d_0 and n_D^{18} of the following glycerol derivs. were redetd. Glycerol, d. 1.27. α-Dibromohydrin, b_{12} 99°, d. 2.11, n 1.543. β-Dibromohydrin, b_{12} 101°, d. 2.148, n 1.557. Tribromohydrin, b_{12} 97°, d. 2.43, n 1.584. M. p. of the *dibromohydrin phenylurethans*; α, 80–1°; β, 83–4°. The compd. $CH_2CHCH_2CH_2Br$, when heated with KOH, forms the *compound*
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$CH_2CHCH:CH_2$, b. 70°, d_0 0.9006, d_{20} 0.87, n_D^{20} 1.416; it instantly decolorizes $KMnO_4$;
O
adds Br in $CHCl_3$, forming the *compound* $CH_2CHCHBrCH_2Br$, b_{12-14} 99°, d_0 2.028,
O
n_D^{22} 1.542; reacts with explosive violence with acidulated H_2O, but if the expt. is carried

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out cautiously, erythrol, $HOCH_2CH(OH)CH : CH_2$, is formed, d_{14} 1.05, n_D^{14} 1.469. Cautiously oxidized below 0° with $Ba(MnO_4)_2$, this erythrol gave $(CO_2H)_2$ and a mixt. of inactive *dl*-erythritols; while with Br in CCl_4 it yielded a viscous liquid from which were obtained crystals, m. 88–9.5°, of $HOCH_2CH(OH)CHBrCH_2Br$ (cf. Grimaux and Cloez, *Compt. rend.*, 110, 462); the part which did not crystallize probably contained its stereoisomer. With HBr in $CHCl_3$, $CH_2CHCHBrCH_2Br$ gives *erythritol tribromohydrin*, $CH_2BrCH(OH)CHBrCH_2Br$, b_{14} 148–50°, which, with PBr_5, yields the tetrabromohydrin m. 118° (cf. Ciamician and Magnaghi, *Ber.*, 19, 569). C. A. R.

Characteristics of some *l*-Phytosterols. II. T. Klobb. *Ann. chim. phys.*, 24, 410–21; cf. *C. A.*, 5, 1464.—The flowers of *Matricaria chamomilla* yield a phytosterol m. 120–31°, α_D —29.3°. It yields 2 apparently different acetates which, with Br, form 2 compds., 1 of which has a comp. corresponding to $C_{30}H_{48}OAcBr_4$, the other to $C_{36}H_{48}OAcBr_2$ (these formulas are given only provisionally). From *Tilia europea* is obtained a phytosterol m. 126°, α_D —29.7°; analyses of the benzoate, m. 140°, acetate, m. 118–9°, α_D —39.7°, and dibromoacetate indicate the comp. $C_{27}H_{46}O$. *Lina vulgaris* gives a phytosterol, m. 133–8°; benzoate, m. 142°, α_D —14.55°; acetate, apparently $C_{29}H_{43}OAc$, m. 117–30°, α_D —38.61° (possibly 2 isomers of the same acetate or acetates of different alcs. are present). From *Verbascum thapsus* is obtained a phytosterol m. 142–4°, α_D —3° 3′, whose comp. corresponds to $C_{17}H_{28}O$, $C_{18}H_{30}O$ or $C_{20}H_{32}O$; it yields 2 acetates, m. 108–10° and 169–71°, α_D —2.65°. Its low rotatory power and comp. distinguish it from the others and it is proposed to designate it as *verbasterol*.

C. A. R.

Oxidation of *m*-Nitrobenzoylformaldehyde. William Lloyd Evans and Edgar John Witzemann. Ohio State Univ. *J. Am. Chem. Soc.*, 33, 1772–9; cf *C. A.*, 2, 2686.—*m*-Nitrobenzoylformaldehyde may be prepared by the action of $(AcO)_2Cu$ on *m*-nitrobenzoylcarbinol or of $AgNO_3$ or $Pb(NO_3)_2$ on *ω*-monobromo-*m*-nitroacetophenone. The identity of the oily *m*-nitrobenzoylformaldehyde was proved by converting it into (1) *m-nitrobenzoylformaldehydeosazone*, dark red needle-like crystals from C_6H_6, m. 223°; the osazone was also obtained directly from *m*-nitrobenzoyl carbinol, and also into (2) *m*-nitromandelic acid by means of $(AcO)_2Cu$ or alkalies. *m*-Nitrobenzoylformaldehyde with $KMnO_4$, $KMnO_4$ and NaOH, $K_3Fe(CN)_6$ and NaOH, freshly pptd. Ag_2O and NaOH, freshly pptd. HgO and NaOH, yields *m*-nitrobenzoic acid exclusively. Stuart J. Bates.

Preparation of Tribasic Phenolphthalates. P. A. Kober and J. T. Marshall. Roosevelt Hospital, N. Y. *J. Am. Chem. Soc.*, 33, 1779–83.—The prep. and properties of the colorless K and Na salts previously mentioned (*C. A.*, 5, 1399) are described in detail. The salts when kept dry and cool are stable for months. Two mols. of the alkali are easily neutralized by weak acids; the third requires a mineral acid.

Stuart J. Bates.

The Decomposition of Uric Acid by means of Dilute Sodium Hydroxide Solutions. Clarence E. May. Univ. of Indiana. *J. Am. Chem. Soc.*, 33, 1783–7.—Steele (*C. A.*, 5, 302), in detg. uric acid in urea by means of NaOH added a large excess of NaCl to minimize the action of the NaOH on other urinary constituents. M. finds that this procedure is justified because the presence of NaCl has little if any effect on the amt. of NH_3 liberated when NaOH decomp. uric acid (0.25 g. per 500 cc.).

Stuart J. Bates.

Synthesis of Fats by the Action of Enzymes. F. L. Dunlap and L. O. Gilbert. Washington, D. C. *J. Am. Chem. Soc.*, 33, 1787–91.—Glycerol, oleic acid flaxseed

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and oil-free castor bean were triturated till an emulsion was formed; detns. of the % of oleic acid were made, immediately and at intervals for 11 days. A decrease in the amt. of acid was found, which can only be due to esterification. A blank without the castor bean showed no decrease in the amt. of acid; hence the castor bean enzyme has synthetic power (cf. Taylor, *Univ. Calif. Publ. Pathology*, 1, 33 (1904) and Welter, *C. A.*, 5, 2112). STUART J. BATES.

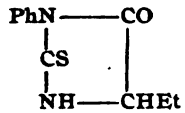
Action of Methyl Magnesium Bromide on Anthraquinone. LATHAM CLARKE AND PAUL W. CARLETON. Harvard Univ. *J. Am. Chem. Soc.*, 33, 1966–73.—Anthraquinone and EtMgBr in Et_2O yield 9,10-diethyl-9,10-dihydroxydihydroanthracene, white hexagonal plates, m. 172° (*C. A.*, 2, 1965). *Methyl ester*, white crystals from MeOH, m. 178°. *Ethyl ester.* Dehydrating agents and HCl, HBr, PCl_5, AcCl, BzCl, etc., on the diol gave only yellow oils. AcCl on the Me ester gave a *compound*, needles from MeOH, m. 135.5–136°. Zn dust and AcOH on the diol yield diethylanthracene. Dil. HCl or H_2SO_4 on the diol, turn it yellow and give 2 *substances*, (1) yellow rhombic plates, m. 161°, (2) yellow prisms, m. 226°; the former gives a phosphorescent soln. in alc. or C_6H_6, the latter does not. Analysis and mol. wt. detn. indicates that both contain 2 anthracene nuclei. Both decolorize Br water and are oxidized by $K_2Cr_2O_7$ to anthraquinone. The probable formulas of the 2 compds. are discussed. STUART J. BATES.

Hydantoins: Synthesis of 2-Thiohydantoin. TREAT B. JOHNSON AND BEN H. NICOLET. Sheffield Lab., Yale Univ. *J. Am. Chem. Soc.*, 33, 1973–8.—*3-Acetyl-2-thiohydantoin* (I below), square blocks or tables, m. 175–6°, was obtained as an intermediate product in the action of KSCN on glycocoll, yield, 83%. Acetylglycocoll and KSCN also yield (I), which on heating with HCl gives 2-thiohydantoin. Hence Komatsu (*C. A.*, 5, 2819) was incorrect in considering $NH_2CSNHCH_2CO_2H$ as an intermediate product in the synthesis of 2-thiohydantoin from glycocoll and KSCN. The authors consider the mechanism to be

$$NH_2CH_2CO_2H + Ac_2O = AcNHCH_2CO_2H \longrightarrow$$
$$Ac(HSCN)NHCH_2CO_2H \longrightarrow Ac(CSNH_2)NCH_2CO_2H$$
$$\text{(I) } AcNCSNHCOCH_2 \quad HNCSNHCOCH_2 + AcOH.$$

Hippuric acid and KSCN in presence of Ac_2O and AcOH yield *3-benzoyl-2-thiohydantoin*, square plates from alc. m. 165°, yield 86%. This compd. is hydrolyzed quant. to 2-thiohydantoin by HCl. 3-Benzoyl-2-thiohydantoin condenses with PhCHO yielding 4-benzol-2-thiohydantoin. STUART J. BATES.

Hydantoins. III. 1-Phenyl-2-thiohydantoins from some α-Amino Acids. CHARLES A. BRAUTLECHT. Sheffield Lab., Yale Univ. *J. Biol. Chem.*, 10, 139–46.—*1-Phenyl-4-ethyl-2-thiohydantoin* (I) is obtained from PhNCS and α-aminobutyric acid; square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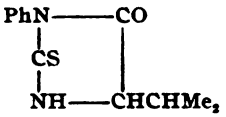
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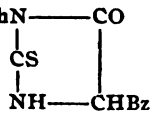
(III)

plates from alc., m. 190–2°. Yield, 97%. *1-Phenyl-4-isopropyl-2-thiohydantoin* (II), from PhNCS α-aminoisovalerianic acid; needles from alc., m. 206–8°. *1-Phenyl-4-benzyl-2-thiohydantoin* (III), from synth. phenylalanine and PhNCS; colorless prisms from alc., m. 187°. *1-Phenyl-4-p-hydroxybenzyl-2-thiohydantoin* (IV) is obtained by the action of PhNCS on tyrosine, obtained by hydrolysis of casein; colorless or straw-colored prisms from alc., m. 214–6°. 0.0789 g. is sol. in 100 g. H_2O at 25°. *1-Phenyl-2-thiohydantoin-4-acetamide* (V), from asparagine and PhNCS; lenticular

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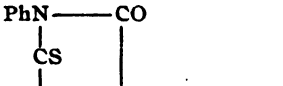
prisms from alc., m. 234°. 1 pt. is sol. in 1550 pts. H_2O. *Potassium salt* of the hydantoic acid, $PhNH.CSNH.CH(CO_2K)CH_2CONH_2$, colorless plates from alc., m. 154°. *1-*



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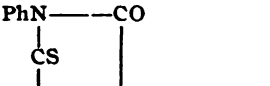

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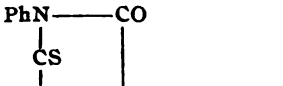
Phenyl-2-thiohydantoin-4-acetic acid (VI), by hydrolysis of (V) with KOH; colorless prisms from alc., m. 233–4°. 1 pt. is sol. in about 1747 pts. H_2O at 25°. *1-Phenyl-2-*



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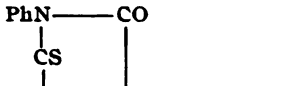

(VII)

thiohydantoin-4-propionic acid (VII), from the hydrochloride of glutaminic acid and PhNCS; microscopic needles from alc., m. 169–70°. 1 pt. is sol. in about 556 pts. H_2O at 25°. When the aq. soln. is evapd. at 100°, a thick sirup, showing very little tendency to cryst., is obtained. D. Breese Jones.

Hydrolysis of Esters. III. Hydrolysis of Esters of Substituted Aliphatic Acids. W. A. Drushel. Lab., Yale Univ. *Am. J. Sci.*, 33, 27–31.—The rate of hydrolysis of $NCCH_2CO_2Et$ in aq. soln. of 0.1 *N* HCl is much slower than that of CH_2ClCO_2Et under the same conditions, the replacement of H by CN in the Ac group causing a much greater depression of the velocity of hydrolysis than would be expected from the strength of the acid generated in the reaction. In aq. soln. alone, $NCCH_2CO_2Et$ hydrolyzes more slowly than CH_2ClCO_2Et, although the former is the more strongly dissociated. This retardation in the hydrolysis of the CN derivs. may be due to an effect analogous to steric hindrance found in esterification, or to the existence of polymerized mols. of $NCCH_2CO_2Et$ in aq. soln. In alk. soln. $NCCH_2CO_2Et$ decomp., first, into alc. and alkali cyanoacetate, and then into alkali malonate and NH_3.

D. Breese Jones.

Action of Chlorine on Hexonic Acids. Paul Dreverhoff. *Chem. Ztg.*, 35, 1323.—D. confirms the results of the investigations of Kiliani and Bazeen, that maltol is formed by heating moist barley malt or caramel malt. It is decomp. by Cl, first into salicylic acid, and then into phenol. Phenol found in dark beers is shown to be due to the action of traces of Cl upon the maltol present. D. Breese Jones.

Separation and Conversion of Benzaldehydes. E. Erlenmeyer, G. H. Hilgendorff and Th. Marx. Biol. Anstalt, Dahlem. *Biochem. Z.*, 34, 386–404.—BzH exists in 2 modifications, storax- and hetero-benzaldehyde. Each form is converted by the Perkin's reaction to the corresponding cinnamic acid. Similar results are obtained if the natural occurring BzH is used, in which in one case the HCN has not been removed and in the other in which the BzH has been entirely freed from HCN. HCN combines more readily with the storax-aldehyde and thus makes it possible to obtain the hetero-aldehyde by fractional distillation of the synthetic aldehyde mixt. G. M. Meyer.

Behavior of Certain Mixtures of Storax Cinnamic Acid and Substituted Cinnamic Acids. E. Erlenmeyer and G. Hilgendorff. Biol. Anstalt, Dahlem. *Biochem. Z.*, 34, 405–16.—The influence of substituted cinnamic acids on the crystn. of storax- and hetero-cinnamic acids has shown that the synthetic cinnamic acid does not contain any *p*-methylcinnamic acid. G. M. Meyer.

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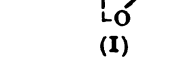
Further Separation Experiments with Heterocinnamic Acid. EMIL ERLENMEYER AND G. HILGENDORFF. Biol. anstalt, Dahlem. *Biochem. Z.*, 34, 417–27.—No acid of different structure than the hetero β-acid could be sepd. from the synthetic cinnamic acid mixt. Repeated fractional crystn. of the synthetic acid causes a gradual transformation of the hetero acid into the storax-cinnamic acid. G. M. MEYER.

Influence of Constitution on the Molecular Volume of Organic Compounds at the Boiling Point. G. LE BAS. *Chem. News*, 104, 151–3, 166–7, 187–9, 199–201.—An address. T. E. LAYNG.

New Organic Compounds of Nitrogen. M. O. FÖRSTER. *Chem. News*, 104, 236–8, 248–9; cf. *C. A.*, 5, 2809. T. E. L.

Unsaturated δ-Ketonic Acids. E. P. KOHLER. *Am. Chem. J.*, 46, 474–502.—A soln. of benzalacetophenone and Me malonate in MeOH was condensed by piperidine in place of NaOEt, formerly used, the Me ester (yield, 85%) and pure acid (after being hydrolyzed, yield, 10%) (*C. A.*, 5, 3680) being formed. *Ethyl γ-benzoyl-β-phenylethylmalonate* (*a*) $Ph[CH(CO_2Et)_2]HCH_2Bz$ by condensation of the acid with HCl, needles, m. 65°. (*b*) *Ethyl ester*, stereoisomer of (*a*) from Br and (*a*), m. 88°. (*c*) Evapn. of filtrate of (*b*) left an oil which solidified in large prisms m. 43°. *Methyl ester* similar to (*b*) sepd. by crystn. from MeOH (*a*) needles, m. 113°, (*e*) plates, m. 87°. Br introduced into boiling soln. of (*b*), (*c*), (*d*) or (*e*), in CCl_4 and exposed to sunlight replaces the second reaction H forming 2 stereoisomers *methyl-γ-benzoyl-α,γ-dibromo-β-phenylethylmalonate* $PhC[CBr(CO_2Me)_2]HCHBrBz$, (*f*) needles m. 132° (*g*) tables m. 94°. The monobromo ester hydrolyzed by 10% soln. KOH produced *methyl-γ-benzoyl-β-phenylvinylmalonate* (*h*) $PhC[CH(CO_2Me)_2]$: CHBz, yield, 60–70%, needles m. 94°. Br added to CCl_4 soln. in sunlight forms $C_{20}H_{17}Br$, m. 141°, probably an addition product. The pure ester hydrolyzed by KOH (one equiv.) produces *benzoylphenylbutyrolactonic acid* (I), pyramids from H_2O, plates from Et_2O m. 170°. From Et_2O filtrate



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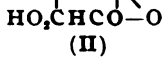

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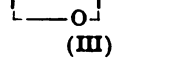

(III)

of hydrolysis of (*h*). *Diphenylhydroxycrotolactonic acid* (II), needles m. 170°. The product obtained by heating the ketolactonic acid contained four substances (*a*) *γ-benzoyl-β-phenylvinyllactic acid* $PhC(CH_2CO_2H)$: CHBz was formed on heating the acid at 170–85°, m. 135° from Et_2O, yield, 95–8%. *Methyl ester* of (*a*) needles, m. 131°. By addition of Br to (*a*) 2 stereoisomeric acids dibromobutyric acids were formed. Both decomp. below m. Added to $NaHCO_3$ produced the same compound $C_{17}H_{12}O_2$, m. 180° probably a γ-lactone. From mother liquor of (*a*) isomeric (*b*) was formed, plates m. 180°. From Et_2O soln. in which (*a*) and (*b*) were extracted two lactones separated, one colorless, the other lemon-yellow; on addition of ligroin to cold Et_2O soln. colorless lactone *γ-benzoyl-β-phenyl-β-butyrolactone* (III), m. 93° separated. Hydrolysis of acid soln. yields benzoylphenylvinyl acetic acid. If not acid on hydrolysis benzaldehyde and benzoyl carbinol were recognized. Satn. of lactone or benzoylphenylvinyllactic acid with HBr yielded *γ-benzoyl-β-phenyl-β-bromobutyric acid* $PhC(CH_2CO_2H)BrCH_2Bz$ decomp. without m. 2 stereoisomeric lactones are formed by adding EtMg chloride at 0° to lactone m. 93° (*a*) by decomp. with H_2O thick needles m. 190° (*b*) by decomp. with conc. HCl, fine needles m. 140°, a third isomer m. 150° was prepared from the K salts of both acids being determined as a δ-lactone. Yellow lactone isomeric with lactone m. 93° was obtained with difficulty from the Et_2O soln., thin plates m. 172°. From its soln. in alc. KOH acids ppt. the unsatd. acid m. 180° probably (IV). Treatment of (II) in the same way as its isomer yielded in equal amounts benzoylphenylvinyllactic acid and δ-hydroxy-β,δ-diphenyl-δ-crotolactone (V)

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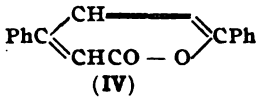
m. 124°. On treating benzoylphenylbutyric acid with Br, 2 stereois mers are formed. (*a*) *γ-Benzoyl-γ-bromo-β-phenylbutyric acid* $Ph(CH.CO_2H)HCHBrBz$ separates from



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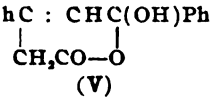
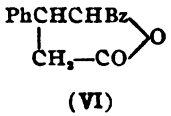


(V)

boiling soln. m. 189° (*b*) m. 145° (decomp.). *Methyl ester* of (*a*) m. 132° of (*b*) m. 87°. When (*a*) and (*b*) dissolved in Na_2CO_3, 2 stereoisomeric lactones are deposited. *γ-Benzoyl-β-phenyl-γ-butyrolactone* (VI) 80% large tables m. 130°; 18% needles m.



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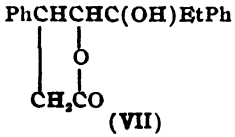
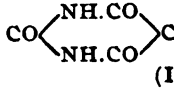


(VII)

98°. Also obtained when (*a*) and (*b*) are heated with dimethylaniline. When dissolved in KOH and acidified with HCl *γ-benzoyl-γ-hydroxy-β-phenylbutyric acid* $PhC(CH_2CO_2H)HCH(OH)Bz$, m. 160° is formed. This acid when allowed to remain in contact with dil. acids passes into lactone m. 130°. When heated above m. acid looses H_2O and passes into lactone m. 98°. Treatment of lactone m. 98° with EtMg chloride forms as one of its products *γ-benzoyl-γ-hydroxyl-β-phenyl-γ-heptalactone* (VII). m. 103°. T. E. LAYNG.

Researches on Pyrimidines: The Condensation of Urea and Guanidine with Esters of Allylmalonic and some Alkyl-substituted Allylmalonic Acids. TREAT B. JOHNSON AND A. J. HILL. Sheffield Lab., Yale Univ. *Am. Chem. J.*, **46**, 537–49.—In presence of alc. Na di-Et malonate condenses with urea to form *5-allylmalonylurea* (I), colorless crystals from alc. m. 167°. In treating with HCl a soln. of (I) hydrolyzed



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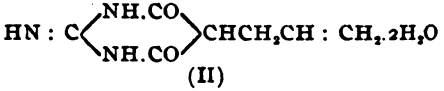
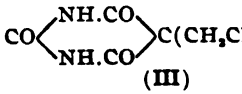


(II)

with KOH, and evapg. to dryness the allylmalonic acid separated, m. 103° from benzene. *5-Allylmalonylguanidine* (II) was prepared as (I) from guanidine hydrochloride and diethyl malonate in presence of NaOEt, hexagonal tables from acetic acid m. 265–6°. *5,5-Diallylmalonylurea* (III) was prepared as (I) from diethyl diallylmalonate and



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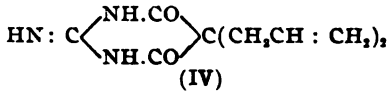
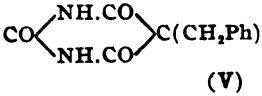


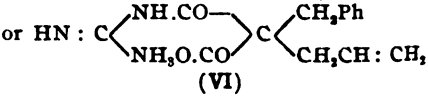
(IV)

urea, rhombohedral crystals from 50% alc. m. 173°. Hydrolysis of (III) yielded the diallylmalonic acid. *Silver salt.* *5,5-Diallylmalonylguanidine* (IV) was prepared as (I) from guanidine hydrochloride and diethyl diallylmalonate in presence of NaOEt, rhombohedral prisms from acetic acid, which do not melt below 300°. Hydrolysis of (IV) yielded the diallylmalonic acid m. 133°. *5,5-Allylbenzylmalonylurea* (V), barrel-shaped prisms m. 198°. Attempts to hydrolyze (V) smoothly under same con-



(V)

or



(VI)

ditions were unsuccessful. *Allylbenzylimidomalonuric acid*, $H_2NC(:NH)NHCOC(CO_2H)(CH_2Ph)CH_2CH:CH_2$ (VI) was prepared by treating guanidine hydrochloride

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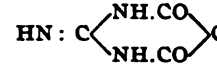
with diethyl allylbenzylmalonate in presence of alc. Na, needle-like prisms from acetic acid, do not melt below 300°; on treatment of (VI) with cold dil. HCl an oily product is formed which finally solidifies to prismatic crystals forming probably a basic salt of allylbenzylmalonylguanidine $(C_{14}H_{18}O_2N_3)_2HCl$. The salt is dissociated by H_2O. *5,5-Allylbenzylmalonylguanidine* (VII) was obtained by alkylation of 5-allylmalonyl-

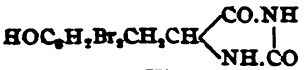


(VII)

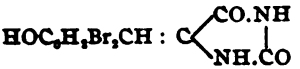
guanidine with benzyl iodide. It is identical with product formed by action of HCl on (VI). Colorless powder did not m. below 300°, attempts to prepare allylbenzylmalonic acid by hydrolysis of (VII) were unsuccessful. *Silver salt. Allylbenzylmalonic acid*, $CH_2 : CHCH_2C(CH_2Ph)(CO_2H)_2$, was obtained by digesting the ethyl ester with alc. KOH as a thick oil. *Silver salt.* T. E. Layng.

1,3,5′-Triiodo-2-bromo-4,6-dinitrobenzene and some of its Derivatives. C. L. Jackson and H. E. Bigelow. Harvard Univ. *Am. Chem. J.*, 46, 549–74.—*1,3,5-Triiodo-2-bromobenzene* (I), $C_6H_2I_3Br$ was prepared when pure triiodoaniline mixed with glacial acetic acid and HBr is treated with $NaNO_2$. Yield, 93%. Yellow needles m. 146°. It is unaffected by HCl, HNO_3, H_2SO_4 or NaOH. *1,3,5-Triiodo-2-bromo-4,6-dinitrobenzene* (II) $C_6I_3Br(NO_2)_2$ was obtained by heating (I) with fuming nitric acid, m. 292°. $C_6Br_2I_2(NO_2)_2$ m. 256–60° was the principal secondary product. When (II) was treated with cold Na malonic ester *1,3-diiodo-2-bromo-4,6-dinitrobenzene* (III) $C_6HI_2Br(NO_2)_2$ m. 187° and the acetylenetetracarbonic ester usually formed, was prepared. From the oily filtrate of (III) *1-iodo-2-bromo-4,6-dinitrophenyl-3-malonic ester* $C_6HIBr(NO_2)_2CH(CO_2Et)_2$ separated, yellow crystals m. 107°. When (II) was treated with NaOEt in presence of benzene. *1,3,5-Triiodo-2-bromo-6-nitrophenetole* (IV) $C_6I_2Br(NO_2)OEt$, m. 148° was formed. (II) with NaOEt formed the *triiodobromonitroanisole* m. 163°. When (IV) was reduced with Zn and acetic acid *m*-aminophenol m. 225° (Ikuta 229°) was formed. Reduction of (II) with acid-reducing agents yielded 5-bromo-*m*-phenylenediamine m. 92°. Reduction with very slightly alkaline $Fe(OH)_2$ yielded *1,3,5-triiodo-2-bromo-4,6-diaminobenzene* $C_6I_2Br(NH_2)_2$ m. 187°. *Hydrochloride.* Experiments conducted for the reducing of other triiodo compounds gave similar results. T. E. Layng.

Hydantoins: The Action of Bromine on Tyrosinehydantoin. Treat B. Johnson and Charles Hoffman. Sheffield Lab., Yale Univ. *Am. Chem. J.*, 47, 20–7.—*3,5-Dibromo-4-hydroxybenzylhydantoic acid* (*3,5-dibromotyrosinehydantoic acid*) (I) $OHC_6H_2Br_2CH_2CH(CO_2H)NHCONH_2$ was prepared from 3,5-dibromotyrosine and KCNO in presence of HCl, prisms m. 190° (decomp.). *3,5-Dibromotyrosinehydantoin* (II) was formed on digesting (I) with conc. HCl, prisms or tables m. 223–5°. *3,5-Di-*



(II)



(III)

bromo-4-hydroxybenzalhydantoin (III) was prepared by boiling 3,5-dibromo-4-hydroxybenzaldehyde, hydantoin and AcONa in glacial AcOH. Yellow needles m. 295° (decomp.) (III) boiled in glacial AcOH with HI formed (II), (II) treated with Br at 100° gave (III). *3,5-Diiodotyrosinehydantoin* (IV) was formed from (II) and (I) in

(IV)

presence of KOH, plates m. 235° (decomp.). T. E. Layng.

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β-Phenyl-α-chlorolactic Acid and Phenylacetaldehyde. BERTHOLD RASSOW AND FRITZ BURMEISTER. Techn. Abt. chem. Univ.-Lab., Leipzig. *J. prakt. Chem.*, **84**, 473–89.—Erlenmeyer and Lipp's method for the prep. of $PhCH(OH)CHClCO_2H$ (*Ann.*, **219**, 185) always yields, in addition, an oily acid richer in Cl, and the $PhCH_2CHO$ obtained from it also contains Cl. The following method makes it possible to prep. large amts. of the acid in pure state: 200 g. fresh bleaching powder (25%) are thoroughly shaken up with 1 l. warm H_2O, allowed to stand 24 hrs. in the dark, treated with 150 g. K_2CO_3, cooled to 0°, filtered after several hrs. and mixed with 65 g. $PhCH : CHCO_2H$ in 200 cc. of 15% K_2CO_3 at 0°; CO_2, carefully freed from acid, is passed through the mixt. 1.5–2 hrs., the soln. is made faintly acid with HCl (d. 1.19), filtered after 24 hrs. and the filtrate extracted with Et_2O. From H_2O or com. $CHCl_3$ the acid seps. in white leaves with 1 H_2O, m. 56–7°; heated 14 ds. at 50°; 0.5 hr. on a b. H_2O bath or kept over conc. H_2SO_4, it loses H_2O and m. 86°; while if cryst. repeatedly from dry $CHCl_3$, the hydrated acid yields an anhydrous form m. 102–3°, which is the stable form. *Ammonium salt*, thin white, leaflets, m. 185° (decomp.). *Aniline salt*, rhombic leaflets, m. 82°. The $PhCH_2CHO$ obtained from it b_{16} 86°. It is very difficult, if not impossible, to obtain good elementary analyses of this substance, owing to the formation of a very volatil acid oxidation product. It slowly resinifies in the air to a transparent waxy product, largely sol. in Et_2O, well-developed crystals m. 148° and having the comp. C_7H_7O remaining undissolved. CHAS. A. ROUILLER.

Picrylpyridinium Chloride. M. BUSCH AND WALTER KÖGEL. Chem. Lab., Univ. Erlangen. *J. prakt. Chem.*, **84**, 507–14.—*Picrylpyridinium chloride*, $C_5H_5NClC_6H_2(NO_2)_3$, obtained by heating equiv. amts. of pyridine and picryl chloride in alc. on the H_2O bath for 20 min., almost colorless or faintly yellowish gray crystals, m. 128°; monoclinic, $a : b = 0.4018 : 1 : c$, β 109° 57′ 35″; contrary to Wedekind's statement (*Ann.*, **323**, 263), it is relatively stable, remaining unchanged in the air for days but finally passing over into the picrate; the same change is effected by long b. with alc., while b. glacial AcOH converts it chiefly into pyridine picrate. With KOH in abs. alc. the chloride forms a *potassium salt*, small prisms, of dark cantharides luster in incident and red-brown color in transmitted light. It is probably the salt of the quinoid pseudo base, $KO_2N : C_6H_2(NO_2)_2 : NHCH : CHCH : CHO$ (cf. Zincke, *Ann.*, **333**, 302; **342**, 365; König, *C. A.*, **5**, 2817). *Picrylpyridinium picrate*, which is formed in the prep. of the chloride, owing to a partial decomp. of the latter into HCl, pyridine and picric acid, yellow needles or gleaming, brownish yellow prisms from dil. alc. containing a little HCl, leaves from Me_2CO, m. 223°, difficultly sol., almost completely decomp. by b. H_2O into pyridine and picric acid. It is obtained almost quant. by adding Na picrate to an alc. soln. of the chloride, while KI gives the *iodide*, orange leaflets with 1 H_2O, m. 155°. When pyridine in alc. is treated with 2 mols. picryl chloride, an *addition compound*, $C_{11}H_7O_6N_4Cl.C_6H_2(NO_2)_3Cl$, is obtained in faintly yellowish green needles, m. 151°, decomp. into its components by H_2O at room temp. and by b. alc.

CHAS. A. ROUILLER.

1-Phenyl-3-methyl-5-pyrazolone and 1-Phenyl-3-methyl-4-amino-5-pyrazolone. A. HEIDUSCHKA AND O. ROTHACKER. Univ. München. *J. prakt. Chem.*, **84**, 533–42.—From phenylmethylpyrazolone, heated 10 min. with aldehydes, were obtained the following compds: *o*-Nitro-4-benzylidene-1-phenyl-3-methyl-5-pyrazolone (cf. Sachs and Sichel, *Ber.*, **57**, 1870). *o-Nitro-4-benzylidenebis-1-phenyl-3-methyl-5-pyrazolone*, faintly yellow leaflets, m. 146° (decomp.). *m-Nitro-4-benzylidene-1-phenyl-3-methyl-5-pyrazolone*, scarlet needles, m. 162°. *Bispyrazolone*, faintly yellow leaflets, m. 150° (decomp.). *p-Nitro-4-benzylidene-1-phenyl-3-methyl-5-pyrazolone*, brown-red crystals, m. 171°; on reduction it forms the $SnCl_2$ double salt of a weakly basic, orange *dye*, m. 205°. Only small amts. of the bispyrazolone compd. are formed.

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BzMe and the phenylmethylpyrazolone, heated 10 min. at 140° with $ZnCl_2$, give a *condensation product* $C_{18}H_{16}ON_2$, orange crystals, m. 89°. BzPh forms a *compound* $C_{28}H_{18}ON_2$, dark, orange-red leaflets, m. 133°. *1-Phenyl-3-methyl-4-styryleneamino-5-pyrazolone*, obtained by reducing the 4-isonitroso compd. in b. glacial AcOH with Zn dust and treating the product with PhCH : CHCHO in EtOH–Et_2O, reddish brown crystals, m. 192°. *o-Nitrobenzylidene-4-amino-1-phenyl-3-methyl-5-pyrazolone*, obtained like the preceding or from the aminopyrazolone hydrochloride and o-$O_2NC_6H_4CHO$ in alc., flesh-colored leaflets, m. 198°. The aminopyrazolone hydrochloride and o-HOC_6H_4CHO give a *compound* $C_{41}H_{34}O_5N_6$, yellow powder, does not m. below 360°, insol. in the ordinary org. solvents; it probably results from the condensation of 3 mols. aldehyde with 2 mols. aminopyrazolone (cf. Rühling, *Ber.*, **27**, 567). Vanillin gives a *compound* $C_{44}H_{40}O_8N_6$, yellow powder, does not m. below 360°. Piperonal yields the *compound* $C_{44}H_{36}O_9N_6$, yellow crystals, m. 235°, sol. in alc. and in alks. From anisal is obtained the compound $C_{44}H_{42}O_6N_6$, yellow crystals, m. 252°.

CHAS. A. ROUILLER.

Methylethylammonium Chlorides. JOHN EDWIN MACKENZIE. Chem. Inst., Univ. Edinburgh. *J. prakt. Chem.*, **84**, 549–54.—NMe_2EtCl, NMe_2Et_2Cl and $NMeEt_3Cl$ can be obtained in 50% yields by heating in sealed tubes at 40–5° EtCl with NMe_3 in alc. soln., EtCl with $NHMe_2$ or MeCl with $NHEt_2$, and MeCl with NEt_3, resp. In the prep. of the 2nd, NH_2Me_2Cl and NH_2Et_2Cl, resp., are also formed; after the alc. has been evapd. off, a slight excess of aq. KOH is added and the secondary amine distilled off.

CHAS. A. ROUILLER.

Reaction of Thiocyanates with Bromine in Aqueous Solution. W. KÖNIG. Dresden. *J. prakt. Chem.*, **84**, 558–60.—When a 2 *N* Br soln. (containing 10% KBr) is cautiously treated with KSCN (or NH_4SCN) until the brown color disappears (the end point can be detd. with KI-starch paper, as the BrCN formed acts on it very slowly), the reaction proceeds sharply and quant. according to the equation $KSCN + 8Br + 4H_2O = KBr + BrCN + H_2SO_4 + 6HBr$. The free acid can be titrated with KOH and phenolphthalein. By means of this reaction, the free Br in a soln. can be detd. with standard thiocyanate or KOH solns.; thiocyanates by means of a Br soln. of known conc. or of KOH. Preliminary expts. indicate that free Cl reacts in the same way while I does not; therefore the reaction can probably be used to det. free Br in the presence of free I.

CHAS. A. ROUILLER.

Electrolytic Reduction of Nitrobenzene. RALPH C. SNOWDON. Cornell Univ. *J. Physic. Chem.*, **15**, 797–844.—A detailed comparative review of the chem. and elec. methods of preparing the reduction products of $PhNO_2$ is given. From his own expts. S. finds that whereas $PhNO_2$ in $FeCl_2$ and HCl b. with pieces of sheet iron is not attacked, if the mixt. is stirred very vigorously, the $PhNO_2$ is reduced to $PhNH_2$. $PhNO_2$ can be reduced electrolytically to $PhNH_2$ in $FeCl_2$ between Fe electrodes at 100°; for a current d. of 15 amp./sq. dm. only 2.2 volts are needed. The current efficiency increases with decreasing current d. In runs without a current, the presence of an Fe salt was necessary (preferably $FeCl_2$); the rate of corrosion of the metallic Fe depends on the conc. of the Fe salt but is not proportional to it. The conc. of the $FeCl_2$ remains unchanged; its catalytic action is apparently due to its being a reducing agent and to its keeping the Fe from becoming passive. $PhNO_2$ is reduced at 100° by alk. Na_2S, $Fe(OH)_2$ and Na arsenite, the yields obtainable being 92–7% $PhNH_2$ with Na_2S, 60–80% $PhNH_2$ with $Fe(OH)_2$, and 90% of azoxybenzene with the arsenite. Alk. $K_4Fe(CN)_6$ does not reduce $PhNO_2$. Theoretically, since an alk. increases the potential of a reducing agent, different reduction products should be obtained according as the $PhNO_2$ is added to a mixt. of alk. and reducing agent, the alk. to a mixt. of $PhNO_2$ and reducing agent, or the reducing agent to a mixt. of $PhNO_2$ and alk. Expt. showed,

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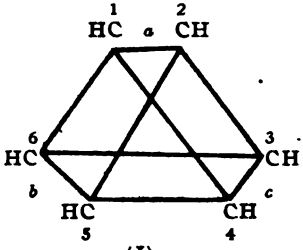
however, that the same result was obtained with $PhNO_2$ added to $FeSO_4$ and alk. as with alk. added to $PhNO_2$ and $FeSO_4$. CHAS. A. ROUILLER.

Cyclic Molecule. New Hypothesis on Benzene. Allotropy and Polymerism. ANÍBAL CHACÓN. Fac. math. Montevidéo. *Separate*, printed (in French) by Juan J. Dornaleche, Montevidéo, 43 pp.—According to this hypothesis, the C_6H_6 ring results from the mutual satn. of 3 tetravalent acetylene groups, $=CH—CH=$ (*a*, *b* and *c* in formula (I)); the bonds originally present between C ats. in the C_2H_2 mols. (represented



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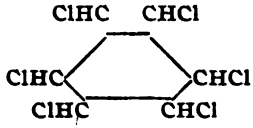
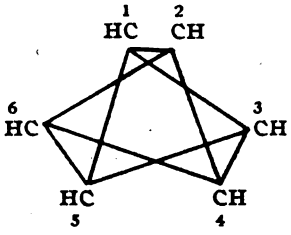


(II)

by shorter lines in the formula) are, according to the hypothesis, stronger than the others. *α*-Benzene hexachloride would then be represented by the formula (II). The C_2H_2 mols. might also condense as shown in (III), and the *β*-hexachloride might



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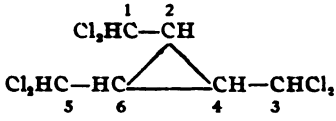

(IV)

then be represented by formula (IV). In formula (I), the H at. 2 is unique as referred to 1 (corresponding to the *p*-position in the Kekulé formula), the 2 being in the same original sub-nucleus; the H ats. 3 and 5, on the one hand, and 4 and 6, on the other, are equiv. as referred to 1, and probably correspond to the meta and ortho positions, resp. The hypothesis offers the following advantages as compared with Kekulé's: It fills up the gap at present existing between cyclic and acyclic compds. by assuming the existence, in aromatic nuclei, of acetylenic sub-nuclei; it brings out more clearly the satd. condition of the C_6H_6 ring; it explains the 2 isomeric benzene hexachlorides; it reduces rigorously to 3 the possible number of disubstitution products; it permits of a consideration of the relations between the ats. of the mol. independently of the graphic representation and of modifying this representation at need without changing the theory. The application of the hypothesis to naphthalene, anthracene, phenanthrene and heterocyclic compds. (*e. g.*, pyridine may be considered as resulting from the condensation of 2 mols. C_2H_2 and 1 of HCN in the tautomeric form $=CH—N=$, pyrone from 2 mols. C_2H_2 and 1 of CO_2 in the form $=C\begin{matrix}O—\\ \\ O—\end{matrix}$, etc.), is discussed; it is also extended to polymeric and allotropic forms, such as O_3, S_6, Se_3, P_6, etc. CHAS. A. ROUILLER.

Action of Ultraviolet Rays on Lactic Acid. MARC LANDAU. *Compt. rend.*, 152,

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9.—Lactic acid, either alone or in H_2O or in H_2O in the presence of U nitrate, exposed to ultraviolet light, gives a gas containing about 90% of CO_2, also some Other products are also formed; in the liquid were detected traces of EtOH and ...ic acid, also a substance which gives a violet-red color with fuchsin decolorized $NaHSO_3$ and SO_2 and reduces Tollens' reagent in the cold. C. A. R.

Catalytic Decomposition of Formic Acid. PAUL SABATIER AND A. MAILHE. *Compt.*, 152, 1212–5; cf. *C. A.*, 5, 2630.—HCO_2H vapors were passed over 0.5 m. of the ...yzer at the rate of about 0.27 g. per min. The following catalyzers decomp. ...acid almost exclusively into CO_2 and H: Pd sponge, action begins at 110° and at 245° there is practically complete decomp.; Pt sponge, begins 120°, complete 215°; reduced Cu produces 278 cc. gas per min. at 190°; Ni, 290 cc. at 280°; Cd, 325 cc. at 280°; SnO begins above 150° and gives 172 cc. gas at 285°; ZnO begins about 190° and gives 192 cc. gas at 230°. TiO_2 and W_2O_5 (blue) decomp. the acid exclusively into CO and H_2O above 170°. The same decomp. is produced by SiO_2, ZrO_2, Al_2O_3 and UO_2, but at the same time there is formed CO_2 *without* H, indicating the decomp. of the acid into HCHO, CO_2 and H_2O; with Al_2O_3, the gas at 235° contains 6% CO_2; with UO_2 at 230°, 14% CO_2. Some catalyzers effect all 3 of the above decomps. Thus, ThO_2 at 250° yields HCHO and a gas containing 75% (by vol.) of CO, 15% of CO_2 and 10% of H; at 320° the % of CO_2 increases to 45, and the condensed liquid contains $CH_2(OMe)_2$ (due to the formation of MeOH from HCO_2H and HCHO); as the temp. is raised, the amt. of MeOH formed increases, and as the HCHO is then partly decomp. into CO and H, the % of the latter increases and that of CO_2 decreases; at 375°, the gas contains only 35% of CO_2. The blue Mo_2O_5, CaO, FeO and Jena glass produce chiefly the decomp. into CO_2 and H; ordinary white glass brings about this decomp. and that into CO and H_2O to about the same extent; the latter is predominant with pulverized pumice, MgO, light wood charcoal, CrO_3, V_2O_3, MnO and BeO. These facts indicate that the action of the catalyzers cannot consist simply in lowering the temp. of reactions which would take place without them; their chem. nature comes into play.

CHAS. A. ROUILLER.

Use of Liquid Ammonia in Chemical Reactions. Investigations on Alcoholates. E. CHABLAY. *Compt. rend.*, 153, 819–21.—Metallic alcoholates, such as $Ba(OEt)_2$, can be prepared by double decomp. of an alk. alcoholate and a salt of the metal (like $Ba(NO_3)_2$) in liquid NH_3 in which the alcoholate is less sol. than the alk. salt ($NaNO_3$); or by action of an alc. in liquid NH_3 on the blue solns. of $(NH_3)_xM''$ (where M'' = Ca, Sr or Ba). CHAS. A. ROUILLER.

Metallic Alcoholates. E. CHABLAY. *Compt. rend.*, 153, 953–5; cf. preceding abstr.—The methylates and ethylates of Ca, Ba, Sr and Pb, the isobutylates of Ca and Pb and Pb amylate have been prepared by the methods described in the earlier paper. All are white products, exceedingly sensitive to the action of heat and moisture.

CHAS. A. ROUILLER.

Oxy-β-methylthiophenes. MAURICE LANFRY. *Compt. rend.*, 153, 821–3; cf. *C. A.*, 5, 3226.—[In the earlier abstract, di- and tetrahydroxythiophene should read di- and tetraoxythiophene, resp.] The action of H_2O_2 on β-methylthiophene is the same as on thiophene. With 1.4 pts. active O is obtained *dioxy-β-methylthiophene*, $MeC_4H_2SO_2$, b. 168–70°, d_{12} 1.25; with 2.5 pts. active O, *tetraoxythiophene*, b. 187–9°, d_{12} 1.37. With Br in the cold, the latter gives *tribromotetraoxy-β-methylthiophenetetrabromide*, $MeC_4Br_7SO_4$, yellow cryst. mass, m. —8°. The reactions of these compds. are similar to those obtained from thiophene. With less than 0.7 pt. active O is obtained a light brown ppt. sol. in alks. CHAS. A. ROUILLER.

Hypoiodous Amides. E. BOISMENU. *Compt. rend.*, 153, 948–51; cf. *C. A.*, 6, 82.

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—*Acetic iodoamide*, AcNHI, obtained by shaking 1.475 g. $AcNH_2$ in Et_2O with successive small portions of I (7 g. in all) and AgOH until the whole of the I is used up; it m. about 143° to a red-brown liquid, losing I. *Propionic iodoamide*, m. 128°. *Formic iodoamide*, m. 95°, unstable, even *in vacuo* or in CO_2. All these compds. give, in AcMe, a gray ppt. with NH_3 which, on drying, easily detonates. CHAS. A. ROUILLER.

Some Properties of Monobromoacrolein. LESPIEAU. *Compt. rend.*, **153**, 951–3. —CH_2 : CBrCHO (cf. Piloty and Stock, *Ber.*, **31**, 1385) reacts energetically with cold $N_2H_4.H_2O$, giving a mixt. of pyrazole and bromopyrazole. It does not react with HCN either in the cold or in a sealed tube at 100°, but if a trace of KCN is added to the aldehyde and HCN is dropped upon it, there is a violent reaction with the formation of a nitrile which is hydrolyzed by HCl to the *acid* CH_2 : $CBrCH(OH)CO_2H$, m. 119–20°; *potassium salt*, extremely deliquescent crystals; *ethyl ester*, b_{750} 216–7°. The acid adds 2 ats. Br to form the *acid* $CH_2BrCBr_2CH(OH)CO_2H$, m. 140–1°. The tailings obtained in the distillation of the CH_2 : CBrCHO, when treated with HCN and KCN, yield a mixt. of acids from which is isolated one isomeric with the above and which therefore probably has the structure $CHBr_2CHBrCH(OH)CO_2H$; it m. 104–5°. Its formation indicates the presence of $CHBr_2CHBrCHO$ in the tailings. C. A. R.

Attempts to Prepare Tetrolic Aldehyde Directly. P. L. VIGUIER. *Compt. rend.*, **153**, 955–7; cf. *C. A.*, **5**, 3409.—In the expts. described below, the free aldehyde could not be obtained. $HCONEt_2$ and MeC ⋮ CMgBr (cf. Bouveault, *Bull. soc. chim.*, [3] **31**, 1490) react slowly and regularly, but the product is *4-diethylamino-2,3,5,6-heptadiine*, $(MeC ⋮ C)_2CHNEt_2$, b_{14} 99–9.5°, d_0^{18} 0.871, n_D^{18} 1.477; *picrate*, yellow needles, m. 169°; *chloroplatinate*, $2C_{11}H_{17}N.PtCl_4.2HCl.2H_2O$, orange crystals, lose their H_2O *in vacuo*, decomp. about 120°; *ethiodide*, needles, decomp. 148–50°. With MeC ⋮ CMgBr and HCO_2Et below —20°, the chief product is *2,3,5,6-heptadiine-4-ol*, $(MeC ⋮ C)_2CHOH$, pearly lamellas, m. 105–6°. Na allylene reacts with HCO_2Et (cf. Moureu and Delange, *Bull. soc. chim.*, [3] **27**, 374; **31**, 1327) and on immediate treatment with H_2O, the odor of MeC ⋮ CCHO is perceptible, but the reaction rapidly slows up and brown viscous products are formed. CHAS. A. ROUILLER.

Derivatives of Tetrolic Aldehyde and its Acetal. P. L. VIGUIER. *Compt. rend.*, **153**, 1231–3; cf. *C. A.*, **5**, 3409.—The acetal condenses in the cold with $PhNH_2.HCl$, giving the *compound* PhNHCMe : CHCH : NPh.HCl, orange prisms, decomp. about 160°. With $PhNHNH_2$ are obtained viscous liquids which, on distillation, yield 1-phenyl-3-methylpyrazole. With H_2NCO_2Et, the aldehyde gives the *compound* $MeC ⋮ CCH(NHCO_2Et)_2$, m. 188–9°, and sublimes; it regenerates the aldehyde when heated with dil. acids. Heated some hrs. at 140° with Na in EtOH, the acetal yields *β-ethoxycrotonic acetal*, $EtOCMe : CHCH(OEt)_2$, b_{18} 82–6°, b. 190–5°, d_{21} 0.908, n_D^{21} 1.430. It slowly colors, finally intensely, an EtOH–H_2O soln. of $FeCl_3$, is slowly hydrolyzed by cold, rapidly by hot, dil. acids and even by H_2O alone to triacetylbenzene, and gives with H_2NCONH_2 the *compound* MeC : CH.CH, pearly lamellas from petro-

$$\begin{array}{l} | \quad\quad \| \\ H_2NCON.H — N \end{array}$$

leum ether, needles from C_6H_6, m. 127–8°; while in moist O it is oxidized to $EtOCMe : CHCO_2H$. CHAS. A. ROUILLER.

Some Derivatives of Cyclopentanone. MARCEL GODCHOT AND FÉLIX TABOURY. *Compt. rend.*, **153**, 1010–1; cf. *C. A.*, **5**, 2094.—The ketone $C_{10}H_{16}O$, obtained by the reduction of cyclopentanone with H and Ni, is reduced by Na and EtOH to *α-cyclopentylcyclopentanol*, b_{18} 125–6°, m. 20°; *phenylurethan*, needles, m. 88–9°. It is identical with the product obtained by the reduction, with Na and EtOH, of Wallach's unsatd. ketone, prepared by the condensation, under the influence of NaOEt, of 2 mols. of

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cyclopentanone, thus showing that the formula earlier proposed by G. and T. for their ketone is correct. Oxidized by hot HNO_3 or by cold dil. $KMnO_4$, the ketone gives glutaric and, apparently, α-cyclopentylglutaric acid. CHAS. A. ROUILLER.

Condensation of Amino Acids in the Presence of Glycerol: Cycloglycylglycines and Polypeptides. L. C. MAILLARD. *Compt. rend.*, 153, 1078–80.—Glycine, kept in an open vessel at 170° with 4–5 pts. glycerol until all the H_2O is driven off, is largely converted (80%) into cycloglycylglycine, $\begin{matrix}NH.CH_2.CO\\ \quad\quad\quad\quad\quad\quad\\ CO.CH_2.NH\end{matrix}$. There is also formed, transitorily, *triglycylglycine*, $H_2NCH_2CONHCH_2CONHCH_2CONHCH_2CO_2H$, giving a magnificent pink biuret reaction, which is anhydrized to a *cyclopolyglycylglycine*, probably the cyclic octopeptide; by a sec. reaction it also gives *pentaglycylglycine*. These compds. are formed in preponderating amts. when the quantity of glycerol is diminished. By the same method were obtained *cyclosarcosylsarcosine*, *cycloalanylalanine* and *cycloleucylleucine*; also mixed glycines, as *cycloleucylvaline*. The reaction is explained as due to the transitory formation of an unstable glyceryl ester.

CHAS. A. ROUILLER.

Catalytic Preparation of Amines of Alcohols. PAUL SABATIER AND A. MAILHE. *Compt. rend.*, 153, 1204–8; cf. *C. A.*, 5, 3228.—The method previously described (action of NH_3 on alcs. at 300–50° in the presence of catalyzers like ThO_2) is applicable to the various sec. alcs., aliphatic, aromatic and cycloaliphatic. Thus, Me_2CHOH at 250° gives about 20% Me_2CHNH_2 and a little $(Me_2CH)_2NH$. Ph_2CHOH at 280° gives a little *aminodiphenylmethane*, alk. liquid, b. 289°, but the chief product is *tetraphenylethylene*, needles, m. 220°, resulting from the dehydration of the hydrol. Cyclohexanol and its homologs are dehydrated only 30–40% by ThO_2 at 290–320° when in the presence of NH_3. From cyclohexanol were obtained $C_6H_{11}NH_2$ and $(C_6H_{11})_2NH$. *o*-$MeC_6H_{10}OH$ gives *o-methylcyclohexylamine*, intensely alk., b. 147°; *phenylurea*, m. 130°. *p-Cyclohexylamine*, b. 154°; *phenylurea*, needles, m. 174°. *Di-p-methylcyclohexylamine*, b. 275° (slight decomp.); *phenylurea*, m. 181°. By using an amine instead of NH_3, mixed sec. amines can be prepared. In this way were obtained the following compds. *Methylcyclohexylamine*, from $C_6H_{11}NH_2$ and MeOH, b. 145°; *hydrochloride*, m. 193°. *Propylcyclohexylamine*, b. 185°; *phenylurea*, m. 113°. *Isobutylcyclohexylamine*, b. 193°; *phenylurea*, m. 90°. *Isoamylcyclohexylamine*, b. 205°; *phenylurea*, m. 129°. *Benzylcyclohexylamine*, b_{30} 195°; *phenylurea*, m. 121°. *Cyclohexyl-o-methylcyclohexylamine*, b. 260° (slight decomp.); *phenylurea*, m. 140°; *hydrochloride*, m. 182°. *Cyclohexyl-m-cyclohexylamine*, b. 270° (slight decomp.); *hydrochloride*, m. 197°; *phenylurea*, m. 191°. *Cyclo-p-methylcyclohexylamine*, b. 270°; *phenylurea*, rhombic tables, m. 108°. CHAS. A. ROUILLER.

Action of Monochlorourea on Ketones. A. BÉHAL AND A. DETOEUF. *Compt. rend.*, 153, 1229–31; cf. *C. A.*, 6, 82.—Chlorourea reacts with ketones in H_2O giving chloroketones; the Cl always combines with the C at. next to the CO. If the ketone is sym., only 1 product is formed; if it is unsym., 2 are formed; the sec. is more easily attacked than the primary C at., so that the sec. deriv. is obtained in greater amt. These chloroketones give chlorosemicarbazones which, when b. with H_2O, substitute the Cl for OH. Thus, a 20% soln. of chlorourea gives, after 72 hrs., 85% of CH_2ClAc with AcMe. EtAc, after 5 ds., gives 50% MeCHClAc and 10% $EtCOCH_2Cl$. Their semicarbazones m. 127° and 121°, resp. The former, b. with H_2O, gives a compd. $HOCHMeCMe : NNHCONH_2$, m. 185°; the latter an analogous compd. m. 136–8°. In the above reactions between chlorourea and ketones, the soln. remains neutral, indicating that there is no oxidation, but with Me hexyl ketone the liquid becomes acid and gas is evolved. A *chloro-octanone*, m. —25°, b_{30} 104–8°, d_0 1.0034, d_{20} 0.985,

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is formed; *semicarbazone*, m. 133°. PhAc is chlorinated exclusively in the side chain, forming $BzCH_2Cl$. CHAS. A. ROUILLER.

Salts and Acids of Alkylaminodithiocarbonic Acids. ERNEST FOURNEAU AND VILA. Lab. thérap. exp., inst. Pasteur. *Bull. soc. chim.*, 9, 985–9.—*Ethyl phenylmethylaminoacetate*, $MeNHCHPhCO_2Et$, from $PhCHBrCO_2Et$ and a 10% C_6H_6 soln. of $MeNH_2$ at 0°, b_{10} 136°; yield, 90%. With CS_2 in Et_2O, it gives *phenyl-N-methyldithiazolone*, $\begin{matrix}PhCH.CO\\ |\quad\quad\\ MeN.CS\end{matrix}\!\!>\!S$, refractive prisms, m. 137°, which, with alc. NH_3 at 100°, forms $MeNHCHPhCONH_2$. *Disodium phenylmethylaminoacetatedithiocarbonate*, $NaS_2CNMeCHPhCO_2Na$, obtained by warming the thiazolone in 4% NaOH, needles in hemispherical groups; a 10% aq. soln. gives a dark green color with $CoCl_2$, violet-brown with $FeSO_4$, lemon-yellow with $AgNO_3$. *Mercuric sodium salt*, $Hg(S_2CNMeCHPhCO_2Na)_2$, from the Na salt and HgO, transparent crystals, becoming powdery and light yellow on drying; the Na salt similarly dissolves organo-Hg compds. such as Hg aniline, phenol, salicylate, etc., thus permitting the use of Hg compds. otherwise insol. (cf. Launoy and Levaditti, *C. A.*, 6, 514). The di-K salt and $SbCl_3$ give a yellow friable, substance sol. in cold H_2O which seems to have the comp. $HOSb(S_2CNMeCHPhCO_2K)_2$. CHAS. A. ROUILLER.

New Dodecane. M. DELACRE. Univ. Gand, lab. recherches. *Bull. soc. chim.*, 9, 1023–4.—When $Me_3CCCl : CH_2$ is treated with Na, there is formed $Me_3CCH : CH_2$, mixed with some $Me_3CC : CH$, and when the HBr addition product of this mixt. is treated, in turn, with Na, a *dodecane* $(Me_3CCH_2CH_2)_2$ is formed under certain circumstances (cf. *Recherches sur la notion, etc.*, Bruxelles, 1905, p. 140); it is a colorless liquid with slightly aromatic odor, b. 185–90°. CHAS. A. ROUILLER.

α-Isodypnopinacolin. M. DELACRE. Univ. Gand, lab. recherches. *Bull. soc. chim.*, 9, 1024–5.—α-Isodypnopinacolin is oxidized in cold AcOH soln. by CrO_3 to a compd. $C_{22}H_{26}O_2$ which seems to be dehydroisodypnopinacone. Dehydroisodypnopinacolin is reduced by Na–Hg to a compd. $C_{22}H_{28}O$, isomeric with the dypnopinacolins, dehydrated, especially by AcCl, with the formation of a hydrocarbon; its m. p. indicates that it is da Costa's β-isodypnopinacolin. CHAS. A. ROUILLER.

Action of Sodium Hypochlorite on Hexamethylenetetramine. MARCEL DELÉPINE. École sup. pharm., Paris. *Bull. soc. chim.*, 9, 1025–9.—*N-Dichloropentamethylenetetramine*, $C_5H_{10}N_4Cl_2$, obtained by the action of com. NaOCl soln. (4–5% active Cl) on hexamethylenetetramine, thin lamellas from H_2O, octahedrons from Et_2O, deflagrates 78–82°; it slowly decomp. in the air, in sealed vessels or in soln. It dissolves in 8–10 pts. of AcOH and on dilution *N-trichlorotrimethylenetriamine* seps. in needles, deflagrates 78°; its formula is probably $\begin{matrix}CH_2.NCl.CH_2\\ |\quad\quad\quad|\\ NCl.CH_2.NCl\end{matrix}$. It can be obtained from the hexamethylenetetramine directly by treating it with NaOCl in the presence of AcOH. It reacts immediately with NaOEt, with evolution of NH_3; the odor of amino esters is also perceptible, and on distilling with a dil. acid, large amts. of HCO_2H are obtained. CHAS. A. ROUILLER.

Isomerism between the Pseudocinchona Base (Corynanthine) and Yohimbine. E. FOURNEAU AND FIORE. Inst. Pasteur, lab. chim. therap. *Bull. soc. chim.*, 9, 1037–40; cf. *C. A.*, 4, 2091, 2095.—The 2 bases are isomeric and have the comp. $C_{21}H_{26}O_3N_2$. *Yohimbine hydrochloride*, $[\alpha]_D^{27}$ 105°. *Corynanthine hydrochloride*, $[\alpha]_D^{20}$ —64.15°. The bases and the acids derived from them sep. from aq. alc. with H_2O which they do not lose except at temp. where decomp. sets in; this explains the widely differing analyses obtained by different workers. CHAS. A. ROUILLER.

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Catalytic Action. V. Friedel and Craft's Reaction. J. BÖESEKEN. Lab. chim. org. haute école techn., Delft. *Rec. trav. chim.*, 30, 381–91; cf. *C. A.*, 4, 1484.—The following expts. show that dissociable chlorides, like SO_2Cl_2, C_2HCl_5, and CCl_3CHO act in the presence of $AlCl_3$ like mixts. of the non-dissociated mol. with activated Cl ats. and of their decomp. products. Thus, C_6H_6, SO_2Cl_2 and $AlCl_3$ gave much $PhSO_2H$ and PhCl, but $PhSO_2Cl$ and Ph_2SO_2 were also isolated. This is just what is to be expected from the theory, as the catalyst displaces the equil. $SO_2Cl_2 \rightleftarrows SO_2 + Cl_2$ considerably to the right (cf. Ruff, *Ber.*, 35, 4469). PhMe and SO_2Cl_2 give somewhat more $MeC_6H_4SO_2Cl$ than C_6H_6, but much MeC_6H_4Cl and $MeC_6H_4SO_2H$ were likewise obtained in this case. Only the *p*-derivs. of these compds. were isolated, but the other isomers were certainly formed. Anisole gave no sulfinic acid or sulfonchloride, but did form $MeOC_6H_4Cl$ and $(MeOC_6H_4)_2SO$. C_2Cl_4 has practically no action on C_6H_6 in the presence of excess of $AlCl_3$, even at 81°, while C_2HCl_5, which is not appreciably attacked by $AlCl_3$ alone at 30°, reacts vigorously with C_6H_6 and $AlCl_3$ at that temp. with evolution of HCl, but the condensation products could not be isolated in any form permitting of their identification. Similarly, CCl_3CHO, which is decomp. by $AlCl_3$ into CCl_4, CO and HCl, reacts vigorously with C_6H_6 at 55° with evolution of CO and HCl; in the complex product, only Ph_2CH_2 was identified. CHAS. A. ROUILLER.

Configuration of Ring Systems. J. BÖESEKEN AND A. VAN ROSSEM. *Rec. trav. chim.*, 30, 392–406.—The work of Magnanini (*Gazz. chim. ital.*, 1890, I, 428; II, 215; 1891, II, 134) on the influence of OH compds. on the elec. cond. of boric acid has been extended to glycol, glycerol, pentaerythritol, PhOH, pyrocatechol, resorcinol, hydroquinone, pyrogallol and phloroglucinol. Glycerol, pentaerythritol, pyrocatechol and pyrogallol increase the cond. of boric acid; the others have no influence or cause a decrease of the cond. The enormous influence of pyrocatechol as compared with the negligible influence of glycol shows that the mere presence of 2 OH groups in the α or *o*-positions is not a sufficient condition to cause the phenomenon. Since α-hydroxy acids also cause an increase in cond., this influence may be exerted by the double bond either of the C : O or of the C_6H_6 ring; it is probably due to a fixation of the 2 OH groups in the same plane so that they can form a ring system with the H_3BO_3 (*C. A.*, 5, 1904). This fixation of the OH groups in the same plane prevents, on the other hand, a ring formation with resorcinol, hydroquinone or phloroglucinol, while it favors even more markedly such a formation with pyrogallol. This, however, does not explain the difference between glycol and glycerol; possibly it is the 2 end OH groups in the latter which are in a favorable position for the formation of a ring (6-at. in this case); this supposition is confirmed by the conduct of pentaerythritol which can form 2 such rings and whose influence on the cond. of boric acid is enormous. The cases where a decreased cond. is observed are probably due to the formation of compds. even less acid than boric acid or whose complex anions have a smaller migration velocity.

CHAS. A. ROUILLER.

Influence of Sulfur and Sulfur Groups on the Order of Substitution by Bromine of the Hydrogen Atoms in Benzene. ED. BOURGEOIS AND A. ABRAHAM. Univ. Liège. *Rec. trav. chim.*, 30, 407–25; cf. *Ibid.*, 22, 349.—In the case of PhSH, there is no substitution by Br, the SH group being attacked and Ph_2S_2 formed. MeSPh and Ph_2S first form the addition products RR'S : Br_2, which then tend to form monobromo substitution products, the Br leaving the S and entering the Ph group with elimination of HBr. *Methyl phenyl sulfide*, from PhSH, Na and MeI in alc., b_{751} 195°; yield, 94%. With Br in CCl_4 at 0° it yields a garnet-red cryst. magma, turning orange on strong cooling, of *methyl phenyl dibromosulfide*, $MePhSBr_2$, m. 87–8° when heated rapidly, evolves HBr even below 0°, forming *methyl p-bromophenyl sulfide*, white scales with yellowish luster, m. 37–7.5°, which is oxidized by $KMnO_4$ to *methyl p-bromophenyl*

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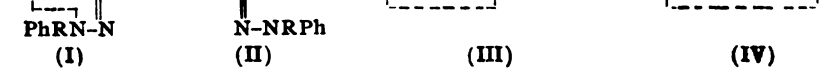
sulfone, m. 102.5–3.0°, which, in turn, when heated 4 hrs. with PCl_5 at 200–10°, gives MeCl, $SOCl_2$ and *p*-BrC_6H_4Cl. The BrC_6H_4SMe was also synthesized from *p*-BrC_6H_4SNa and MeI. Similarly, from Ph_2S was obtained *diphenyl dibromosulfide*, red cryst. ppt., even more unstable than the Me compd. above, decomp. into a mixt. of *p*-BrC_6H_4SPh and $(p\text{-}BrC_6H_4)_2S$. The former is formed in greater amt. if dil. solns. of Br and Ph_2S are used at —10° and the red crystals are allowed to stand in the liquid at 0° until the evolution of HBr is complete, while the latter is obtained exclusively if more conc. Br is used at room temp. In solvents Br does not appreciably attack Ph_2S_2; without solvents there is a brisk evolution of HBr and $(p\text{-}BrC_6H_4)_2S_2$ is formed. The intermediate addition product which is probably formed was not isolated. Böeseken's observations on the action of Br on Ph_2SO (*C. A.*, **5**, 678) are confirmed. Br does not react with $PhMeSO_2$ without the aid of a catalyzer, but in the presence of $FeCl_3$ it forms *p*-$BrC_6H_4MeSO_2$. CHAS. A. ROUILLER.

Angeli-Rimini Aldehyde Reaction. A. ANGELI. *Atti accad. Lincei*, **20**, II, 445–9; cf. Balbiano, *C. A.*, **6**, 84.—When ketones such as Wallach's $MeOC_6H_4CH_2Ac$ (*Ann.*, **332**, 318) are tested with Piloty's acid in a soln. *distinctly* alk. but not containing an excess of alk. they do not give the Angeli-Rimini aldehyde reaction. Owing to the weakness of the acid, the soln. becomes alk., through hydrolysis, long before the theoretical amt. of alk. is added. It is therefore better to use the Na salt of Piloty's acid. On the other hand, with excess of alk., a small amt. of a Cu salt was obtained which, with $FeCl_3$, gave the violet color of hydroxamic acids. Similarly, $PhCH_2Bz$, PhCHBzOH, Bz_2 and $(PhCH_2CO)_2$, which give BzH with alk., gave a positive Angeli-Rimini test in the presence of excess of alk. but not when the soln. was made only distinctly alk. CHAS. A. ROUILLER.

Essence of Seseli bocconi. L. FRANCESCONI AND E. SERNAGIOTTO. Ist. chim. gen. r. univ. Cagliari. *Atti accad Lincei*, **20**, II, 481–6.—From 100 kg. roots, stalks and leaves were obtained, by steam distillation under 0.5–1 atm., 295 g. essence, d_{17} 0.8475, α_D 4.289–5.887, n_D 1.4637–1.4673. It rapidly colors Schiff's reagent and partially combines with $NaHSO_3$, and gives a wine-red color with a drop of conc. H_2SO_4 in Ac_2O. It contains practically no phenols. The portion combining with $NaHSO_3$ gives a semicarbazone m. about 178°. The consts. of the fractions obtained by distilling under 10 mm. vary from b. 81°, d. 0.84328, α_D —9.32°, n_D 1.4601, to b. 102–5°, d. 0.8422, α_D 22.67°, n_D 1.4624. The first contains 86.59% C and 11.97% H, corresponding to $C_{10}H_{16}$, the last 83.52% C and 12.23% H. The action of NOCl on the first fractions indicates that their chief constituent is *l*-pinene; that of the higher fractions, *β*-phellandrene. CHAS. A. ROUILLER.

Aromatic Nitro Derivatives. II. R. CIUSA. Ist. chim. gen. r. univ. Bologna. *Atti accad. Lincei*, **20**, II, 523–4; cf. *C. A.*, **4**, 1740; **5**, 3804.—$C(NO_2)_4$, although capable of forming addition products, is not dissociated in HCO_2H, as shown by f. p. detns., a further confirmation of the independence between additive power of nitro compds. and dissociation. CHAS. A. ROUILLER.

Nitro Derivatives and Nitrohydrazones. R. CIUSA. Ist. chim. gen. r. univ. Bologna. *Atti accad. Lincei*, **20**, II, 578–83; cf. *C. A.*, **6**, 353.—The chromoisomerism of the nitrohydrazones is probably due to the fact that they can exist in 2 forms, the red (probably malenoid) forming an inner addition product. The 2 forms would then be represented by formulas (I) and (II). The chromoisomeric forms of nitrobenzaldehyde *p*-nitrophenylhydrazones (cf. *C. A.*, **5**, 3405) may possibly be represented by



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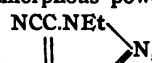
formulas (III) and (IV). Similarly, the chromo salts of nitroketones may be internal addition products, by means of secondary valences, between the metal and the CO group, —CO—C : NO_2M. CHAS. A. ROUILLER.

Asymmetric Selenites. L. MARINO AND V. SQUINTANI. Ist. chim. gen. r. univ. Pisa. *Atti accad. Lincei*, **20**, II, 666–70; cf. *C. A.*, **2**, 3314.—When perfectly dry SeO_2 is added to cold piperidine in C_6H_6, a *compound* $C_5H_{10}NHSeO_3$ is obtained in colorless, extremely hygroscopic crystals, m. 70–1° when absolutely dry, loses piperidine on distillation with alk.; its aq. and alc. solns. give all the reactions of H_2SeO_3. In alc. it probably forms an asymmetric piperidinium alkyl selenite, as the solns. show quite a high elec. cond., but Et_2O ppts. it unchanged from the cold soln. and alc. $ZnCl_2$ forms $ZnSeO_3$. With $PtCl_4$ in MeOH, it forms piperidine chloroplatinate. C. A. R.

Action of Hydrazoic Acid on Cyanogen. Formation of Cyanotetrazole. E. OLIVERI-MANDALÀ AND T. PASSALACQUA. R. ist. chim. univ. Palermo. *Gazz. chim. ital.*, **41**, II, 430–5; cf. *C. A.*, **4**, 2445.—H_3N and $(CN)_2$ condense in H_2O to form *cyanotetrazole*, strongly acid needles, turns slightly pink at about 70°, m. 99°, forms insol. salts with the heavy metals. *Silver salt*, curdy ppt., darkens in the light. *Barium salt*, $(C_2N_5)_2Ba.3.5H_2O$, amorphous powder. The Ag salt and EtI in C_6H_6 or Et_2O give *N-ethylcyanotetrazole*,  , b_{46} 127°; with H_2O_2 this gives *N-ethyltetrazolecarboxamide*, scales, m. 125–6°. Alc. KOH hydrolyzes the amide to *N-ethyltetrazolecarboxylic acid*, prismatic needles, m. 124–5° (loss of CO_2), forming *N-ethyltetrazole*.
CHAS. A. ROUILLER.

Calcones and Hydrocalcones. G. BARGELLINI AND LEDA BINI. Ist. chim. r. univ. Roma. *Gazz. chim. ital.*, **41**, II, 435–45.—*o*-HOC_6H_4CH : CHBz is reduced completely to $HOC_6H_4CH_2CH_2Bz$ in Et_2O in the presence of Pt black (prepared by Loew's method, *Ber.*, **23**, 289) by a current of H. Similarly, from *p*-$MeOC_6H_4CH$: CHBz is obtained *4-methoxyhydrocalcone*, needles, softens 55°, m. 59–60°, turns yellow in the light, sol. in conc. H_2SO_4 with yellow color; *semicarbazone*, needles, m. 118–20°. 3,4-$(CH_2O_2)C_6H_3CH$: CHBz gives *methylene-3,4-dioxyhydrocalcone*, needles, softens 35°, m. 39–40°, sol. in conc. H_2SO_4 with red color; *semicarbazone*, needles, m. 153–4°.
CHAS. A. ROUILLER.

Hydroxyhydroquinone Derivatives. IV. G. BARGELLINI AND ERMANNO MARTEGIANI. *Gazz. chim. ital.*, **41**, II, 445–53; cf. *C. A.*, **5**, 3405. C. A. R.

Chlorine Derivatives of Pyridine. XI. Some Interactions of 3,4,5-Trichloropicolinic Acid and its Derivatives. W. J. SELL. Cambridge. *Proc. Chem. Soc.*, **27**, 220–1; *J. Chem. Soc.*, **99**, 1679–84.—When hexachloropicoline is decompd. by 80% H_2SO_4, some of the chief product, 3,4,5-trichloropicolinic acid, by a displacement of a Cl at. by OH, is transformed into *dichloro-3(or 5)-hydroxypicolinic acid*, $C_6H_3O_3NCl_2$; needles. This compd. decomps. without m. into CO_2 and 4,5-dichloro-3-hydroxypyridine. When the hexachloropicoline reacts with alc. NaOH, *3,5-dichloro-4-hydroxypicolinic acid*, $C_6H_3O_3NCl_2.2H_2O$, results; needles. This is resolved by heat to the corresponding *dichlorohydroxypyridine*, needles, isomeric with the above dichlorohydroxypyridine. When 3,4,5-trichloropicolinic acid is heated to 140° with strong NH_4OH under pressure there results *3,5-dichloro-4-aminopicolinic acid*, $C_6H_4O_2N_2Cl_2.H_2O$; prismatic cryst. m. 172° (decomp.). This acid when heated a few degrees above its m. p. yields *3,5-dichloro-4-aminopyridine*, $C_5H_4N_2Cl_2$, needles, m. 161°, which is also obtained by heating in a sealed tube trichloropyridine and NH_4OH for several hrs. at 150°.
E. E. GORSLINE.

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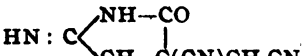
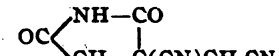
Formation and Reactions of Imino Compounds. XVI. Reactions Leading to the Formation of Tricarballylic Acid. F. B. THOLE AND J. F. THORPE. Sheffield Univ. *Proc. Chem. Soc.*, **27**, 219; *J. Chem. Soc.*, **99**, 1684–90.—*2-Imino-4-cyano-4-cyanomethyl-5-pyrrolidone* (I), results from treating cyanoacetamide with Na and EtOH and then

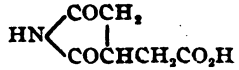


(I)



(II)

iodoacetonitrile; prisms from H_2O, m. 215–20°. By heating the base with dil. HCl, *4-cyano-2,5-diketo-4-cyanomethylpyrrolidine* (II), results; prisms from H_2O, m. 137–8°. By treating the imino compd. with alkali, *tricarballylimide* (III), results;



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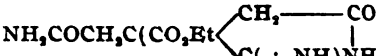
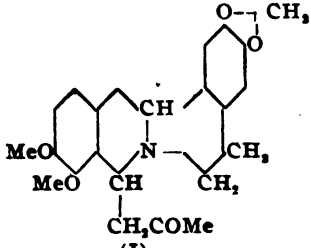


(IV)

prisms from C_6H_6, m. 127–8°. When chloroacetamide is added to a soln. of Et cyanoacetate and Na in EtOH and the mixt. b. on a H_2O bath, there results, *ethyl-2-imino-3-carbamylmethyl-5-pyrrolidone-3-carboxylate* (IV), needles from H_2O, m. 191°, with gas evolution. By heating a soln. of this compd. with dil. HCl, *ethyl 2-5-diketo-3-carbamylmethylpyrrolidine-3-carboxylate*, $C_9H_{12}O_5N_2$, results; small needles, m. 127°. Both the above compds. yield tricarballyric acid on complete hydrolysis with dil. H_2SO_4. By mixing Et cyanoacetate, Na and EtOH and adding iodoacetonitrile and heating on an H_2O bath for 0.5 hr., nearly a quant. yield of *ethyl α,β,β'-tricyanoisobutyrate*, is obtained; $CNCH_2C(CN)(CO_2Et)CH_2CN$, b_{18} 205°. By shaking this compd. with a soln. of KOH, CO_2 is eliminated and *α,β,γ-tricyanopropane* (*tricyanohydrin*), $CNCH_2CH(CN)CH_2CN$, results; needles from Et_2O, m. 47°. There is no tendency to to form either the 3- or 4-C ring through the agency of the imino group. E. E. G.

Isoquinoline Derivatives. VI. *neo*-Oxyberberine. F. L. PYMAN. Wellcome Chem. Wks., Dartford, Kent. *Proc. Chem. Soc.*, **27**, 215; *J. Chem. Soc.*, **99**, 1690–9.—By oxidizing berberineacetone, $C_{22}H_{23}O_5N$, with $KMnO_4$ in aq. acetone, there results, *neo-oxyberberineacetone* (I), hexagonal plates from abs. EtOH, m. 228–9° (decomp.).



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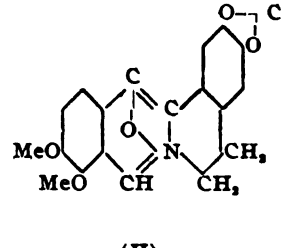

(II)

When the compd. is hydrolyzed by dil. acids salts of *neo*-oxyberberine these results *neo-oxyberberine* (II), cryst. from EtOH in golden brown prismatic needles with 1 mol. alc. of crystn.; m. 275° (decomp). *Semihydrochloride*, $(C_{20}H_{17}O_5N)_2.HCl.3H_2O$, deep yellow, curved, silky needles, from EtOH or H_2O; m. 227° (decomp.). *Hydriodide*, $C_{20}H_{17}O_5N.HI.H_2O$, deep yellow needles from H_2O, decomp. 275°. By heating *neo*-oxyberberine and MeI in a sealed tube at 100° for 2 hrs. *methoxyberberinium iodide*, $C_{21}H_{20}O_5NI$, results; golden brown prismatic plates from H_2O, m. 256° to a black liquid. *Chloride*, $C_{21}H_{20}O_5NCl,3H_2O$, yellow needles from H_2O, m. 117°. *Neo*-oxyberberine is reduced by Sn and HCl to tetrahydroberberine. Its

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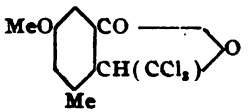
$CHCl_3$ soln. suffers spontaneous oxidation in the air yielding 1-keto-6,7-methylenedioxytetrahydroisoquinoline and 1-EtH hemipinate. The phenolbetaine constitution assigned to *neo*-oxyberberine is supported by its general properties and the formation methoxyberberinium iodide with MeI. E. E. GORSLINE.

Absorption Spectra of Various Chlorine and Bromine Derivatives of Benzene and Toluene as Vapors, in Solution and in Thin Films. J. E. PURVIS. Cambridge. *Proc. Chem. Soc.*, 27, 218; *J. Chem. Soc.*, 99, 1699–1712.—The spectra of *o*- and *m*-dichloro- and dibromo-benzene, *o*- and *m*-chlorotoluene and *m*-bromotoluene were examd. Each vapor possesses a considerable number of bands which can be divided into groups, regulated by the type and number of the side chains. EtOH solns. give fewer bands and of a different type from the vapor bands. The bands observed through very thin films are not unlike the soln. bands and differ only in position. E. E. GORSLINE.

Substances Related to Cochenillic and Carminic Acids. I. Synthesis of the Methyl Ether of β- and of γ-Coccinic Acids. A. N. MELDRUM. Manchester Univ. *Proc. Chem. Soc.*, 27, 216; *J. Chem. Soc.*, 99, 1712–21.—5-Hydroxy-*m*-toluic acid was synthesized according to the directions of Tingle (*Diss.*, München, 1899). By means of $MeSO_4$ this was converted into *methyl methoxy-m-toluate*, $C_{10}H_{12}O_3$, b_{758} 262–8°. This was treated with H_2SO_4 and chloral hydrate and after 24 hrs. dil. with H_2O; a heavy liquid sepd. which solidified in rectangular plates, $C_{11}H_9O_3Cl_3$, m. 116–7°. This was a mixt. of *5-methoxy-3-methyl-2-trichloromethylphthalide* (I) and its isomer, *3-methoxy-*



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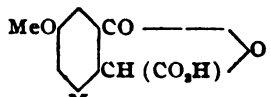
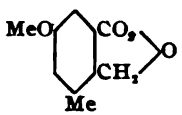


(II)

5-methyl-2-trichloromethylphthalide. They could not be sepd. by crystn. To 15 g. of the powdered mixt. its own wt. of EtOH was added and it was heated to the b. p. 15 g. of NaOH in 75 cc. H_2O was added and the mixt. cooled to 50–60°. Minute crystals of a Na salt sepd. giving on acidification, *5-methoxy-3-methylphthalide-2-carboxylic acid* (II), prisms and plates from acetone, m. 170°. *Calcium salt*, $(C_{11}H_9O_5)_2Ca.3H_2O$, crysts. in warts. The mother liquors were treated with acid until slightly alk. and the EtOH b. off. The soln. was acidified and the ppt. dissolved in NH_4OH and treated with $CaCl_2$. A mixt. of the Ca salts resulted, the salt of 5-methoxy-3-methylphthalide-2-carboxylic acid pptg. first. *Calcium 3-methoxy-5-methylphthalide-2-carboxylate*, cryst. in silky needles. *3-Methoxy-5-methylphthalide-2-carboxylic acid*, $C_{11}H_{10}O_5$, oblique prisms from acetone, m. 190°. *5-Methoxy-3-methylphthalide* (III),



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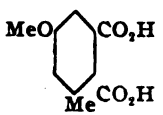

(IV)

results from heating the acid with naphthalene to 180–90° until the evolution of CO_2 ceases; needles or prisms fron H_2O or acetone, m. 105.5°. By dissolving in KOH and oxidizing with $KMnO_4$, *5-methoxy-3-methylphthalic acid* (IV), results; m. 184°. By heating the acid carefully *5-methoxy-3-methylphthalic anhydride*, $C_{10}H_8O_4$, resulted; needles from hot C_6H_6, m. 139°. *3-Methoxy-5-methylphthalide*, $C_{10}H_{10}O_3$, yellow scales from EtOH, m. 135.5°. *3-Methoxy-5-methylphthalic* acid, $C_{10}H_{10}O_5$, colorless crysts. from acetone, m. 200°. *Anhydride*, pale yellow needles from C_6H_6, m. 167°.

E. E. GORSLINE.

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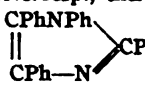
Reactivity of Ketones toward Iodine and the Relative Rates of Tautomeric Change. H. M. DAWSON AND H. ARK. Leeds Univ. *Proc. Chem. Soc.*, 27, 223; *J. Chem. Soc.*, 99, 1740–5.—Further measurements (see Dawson and Wheatley, *C. A.*, 5, 2058) have been made of the tautomeric change of dialkyl detones and substituted acetophenones. The rate of change of the symmetrical dialkyl ketones diminishes with increase of the number of C ats. in the alkyl group. The data for MePr and Me*iso*Pr, MeBu and Me*iso*Bu ketones shows that substitution of the normal for the *iso*alkyl group reduces the reactivity of the ketone by about 25%. The reactivity of Me *tert.*-butyl ketone, in which the butyl group represents the inactive radicle, is only about 0.4 as great as that of the corresponding normal ketone. Substitution of a H at. of the Ph group in acetophenone by a negative at. or group leads to a reduction in the rate of tautomeric change, and similar substitution of one of the H ats. of the Me group appears to prevent the change from taking place. E. E. GORSLINE.

Formation of Glyoxalines from Acyl Derivatives of α-Keto-β-anilino-α,β-diphenylethane. A. E. EVEREST AND H. MCCOMBIE. Birmingham Univ. *Proc. Chem. Soc.*, 27, 209; *J. Chem. Soc.*, 99, 1746–51.—Glyoxalines can be prepared from acyl derivs. of α-keto-β-anilino-α-β-diphenylethane by heating these compds. with NH_4OH in sealed tubes. From the benzoyl, acetyl and formyl derivs. resp., there have been prepared by this method: *1,2,4,5-tetraphenylglyoxaline*,  , colorless needles from EtOH, m. 215°. *Picrate*, golden yellow leaflets from alc., m. 199°. *Hydrochloride*, cubes, m. 250. *Chloroplatinate*, salmon-pink micro-crystals. *1,4,5-Triphenyl-2-methylglyoxaline*, $C_{22}H_{18}N_2$, crysts. from MeOH, m. 194°. *Picrate*, golden yellow needles from MeOH, m. 180°. *Hydrochloride*, m. 300°. *Chloroplatinate*, salmon-pink, micro-crystals. *1,4,5-Triphenylglyoxaline*, $C_{21}H_{16}N_2$, silky needles from MeOH, m. 172°. *Picrate*, golden yellow needles from MeOH, m. 215°. *Hydrochloride*, very sol.; not isolated. *Chloroplatinate* crysts. from AcOH. *α-Keto-β-benzoylanilino-α,β-diphenylethane*, made from the aniline compd. by the Schotten-Baumann reaction, BzCHPhNPhBz, leaflets from MeOH, m. 149°. *α-Keto-β-formylanilino-α,β-diphenylethane*, BzCHPhNPhCHO, prepared by heating 2 parts of the pure base with anhyd. HCO_2H, crysts. from MeOH, m. 105°. α-Keto-β-anilino-α,β-diphenylethane is yellow and gives a yellow soln. in alc. but this turns colorless when a drop of acid is added. The acyl derivs. are colorless and give colorless solns., but these become strongly yellow on addition of a drop of alkali. There is a possibility of enolic and ketonic forms of these compds. E. E. GORSLINE.

Effect of Heat on Benzaldehydecyanohydrin and Aniline. A. E. EVEREST AND H. MCCOMBIE. *Proc. Chem. Soc.*, 27, 219; *J. Chem. Soc.*, 99, 1752–64.—After 0.5 hr. heating a quant. yield of anilinophenylacetonitrile was obtained which has hitherto resulted only from the use of a sealed tube or a catalyst. When the heating is continued for 48–96 hrs. there result *dibenzoyldianilinostilbene*, BzPhNPhC : CPhNPhBz, needles from AmOH, m. above 300° *methiodide*, $C_{40}H_{30}O_2$, MeI, m. above 350° and some 1,2,3,4-tetraphenylglyoxaline. Some α-keto-β-anilino-α,β-diphenylethane was sometimes isolated and benzanilide was present. The dibenzoyl compd. was decompd. quant. by KOH yielding *monobenzoyldianilinostilbene*, $C_{28}H_{26}ON_2$, m. 212°. *Hydrochloride*, from AcOH or EtOH, m. above 350°. *Chloroplatinate*. *Acetate*, $C_{28}H_{26}ON_2$, $2C_2H_4O_2$, needles from H_2O, m. 335°. With picric acid a *compound*, $C_{28}H_{26}ON_2C_6H_2(NO_2)_3$ results; silky needles from alc., m. 274.5°. With *o*-nitrophenyl a *compound*, $C_{28}H_{26}ON_2C_6H_4NO_2C_6H_4(NO_2)OH$, results; from MeOH-$H_2O$ orange-yellow hexagonal plates, m. 183°. The *p-nitrophenol compound*, lemon-yellow hexagonal plates from MeOH-H_2O, m. 210–12°. The *phenol compound*, $C_{28}H_{26}ON_2C_6H_5$, $2C_6H_5OH$,

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crysts. from abs. EtOH, m. 226°. A soln. of benzoyldianilinostilbene under atmospheric oxidation yields benzanilide and dibenzoylaniline. When heated its decomps. regenerating the dibenzoyl compd. and forming benzanilide and benzyldianil. Benzoyldianilinostilbene is yellow but a colorless modification has been prepared. By a spectroscopic exam. it is found that its salts are derived from the colorless variety. E. E. GORSLINE.

Action of Benzylamine on *p*-Dibromosuccinic Acid. E. P. FRANKLAND. Univ. Birmingham. *Proc. Chem. Soc.*, **27**, 206; *J. Chem. Soc.*, **99**, 1775–83.—In alc. solns., the compds. successively formed are, dibromosuccinic acid dibenzylamine; *bromomaleic acid monobenzylamine*, $C_{11}H_{11}O_4NBr$, prismatic plates or needles, m. 145°; *benzylaminobromosuccinic acid monobenzylamine*, $HO_2CCH(NHC_7H_7)CHBrCO_2H$, rectangular plates, m. 156–7° and *dibenzylaminosuccinic acid monobenzylamine*, $HO_2CCH(NHC_7H_7)$-$CH(NHC_7H_7)CO_2H$. By dissolving in HCl on pptg. with H_2O, *dibenzylaminosuccinic acid*, $C_{18}H_{20}O_4N_2$ results; acicular prisms, decomp. 251°. *Dihydrochloride*, m. 165° (decomp.). The action in aq. solns. yielded dibenzylaminosuccinic acid dibenzylamine and *dl-tartaric acid dibenzylamine*, $C_{18}H_{20}O_4N_2$ rhomboidal plates from alc., m. 203–5°. E. E. GORSLINE.

Absorption Spectra of the Isomeric Hydrazones and Semicarbazones of Camphorquinone. F. R. LANKSHEAR AND A. LAPWORTH. Univ. Manchester. *Proc. Chem. Soc.*, **27**, 224; *J. Chem. Soc.*, **99**, 1785–7.—The spectra fall into 2 sets suggesting a classification of the compds. into 2 series which are identical with the α- and β-series of Forster and Zimmerli (*C. A.*, **5**, 1080, 2850). The points of difference between the 2 classes are not sufficiently marked to appreciably weaken the case in favor of the view that the relationship is stereochem. E. E. GORSLINE.

Synthesis of Hydrocarbons at High Temperatures. J. N. PRING AND D. M. FAIRLIE. Univ. Manchester. *Proc. Chem. Soc.*, **27**, 217; *J. Chem. Soc.*, **99**, 1796–1811.—When pure H in the form of a rod is electrically heated in an atm. of H, at 1200°, CH_4 and C_2H_4 are formed, the rate of formation of C_2H_4 being about 0.01 that of the CH_4. No C_2H_2 could be detected. Measurements made of the rate at which C_2H_2 and C_2H_4 react with H to give CH_4 show that sufficient time was not allowed in the above expts. for any large interaction of C_2H_4 and C_2H_2 with H to occur, so that the formation of the hydrocarbons must have been direct. At 1400° and at pressures between 10–40 cm. CH_4 and C_2H_2 are obtained, the ratio of their rate of formation being about 10 : 1. At 1650° CH_4, C_2H_4 and C_2H_2 are obtained, and, as at higher temps. the quantity of C_2H_4 is about twice that of the C_2H_2. Pd in contact with the C assists catalytically the formation of CH_4 to the same degree as Pt, while Si has no appreciable effect. As the presence of a highly charged elec. field makes no difference in the rate of formation of CH_4 between 1200–1600° no complication is produced in the reaction by ionization from heated C. The formation of C_2H_4 which has not before been observed at these temps. can be detected at 1200° and 1400°; it is comparable with the CH_4 formed. E. E. GORSLINE.

Acid Character of Gallotannic Acid. R. PANIKER AND E. STIASNY. Univ. Leeds. *Proc. Chem. Soc.*, **27**, 213; *J. Chem. Soc.*, **99**, 1819–27.—The hydrion conc. of various samples of gallotannic acid purified by various methods has been tested by the method of Bredig and Fraenkel which is based on the dissociation of diazoacetic ester by the catalytic action of hydrions, the conc. of which detns. the speed of the development of N. Their acid character is distinctly greater than could be explained by the presence of the phenolic groups only, and thus free COOH groups must be present. This confirms the views of Schiff and Nierenstein (*Ber.*, **38**, 3641 (1905); *C. A.*, **1**, 1408; **3**, 1013, 2129) in contradiction with those of Bottinger (*Ber.*, **17**, 1503 (1884)), Walden

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(*Ber.*, 31, 2170 (1898)) and Dekker (*Ber.*, 39, 2497 (1906)). The authors believe that the purest acid obtainable is a mixt. of at least 2 components of allied character.

E. E. GORSLINE.

Bimolecular Glycollaldehyde. N. P. MCCLELAND. Cambridge. *Proc. Chem. Soc.*, 27, 224; *J. Chem. Soc.*, 99, 1827–35.—The behavior of this compd. as a vapor and in different solvents has been examd. to ascertain whether it is a kind of acetal formed from 2 mols., the OH group of the one reacting with the CHO group of the other, or whether the phenomena is due to a mol. association of an unusually intense kind. The latter view seems to be correct and by means of the absorption spectrum of the bimol. soln. a suggestion as to the character of association has been made.

E. E. GORSLINE.

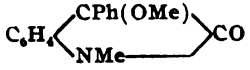
Action of Acid Chlorides on Potassium Nitrate and the Formation of Acid Anhydrides. OTTO DIELS AND HARUKICHI OKADA. Chem. Inst., Univ. Berlin. *Ber.*, 44, 3333–6.—The yield of Ac_2O from AcCl (8 mols.) and KNO_3 (2 mols.) is almost quant. The other products are KCl, Cl, N oxides, NOCl and possibly NO_2Cl. Chloroacetyl chloride gives *chloroacetic anhydride*, $(ClCH_2CO)_2O$; cryst., m. 46–7°; b_{14} 115–25°. Yield, 81%. BzCl gave Bz_2O. $AcNO_3$ (2 mols.) and AcCl (6 mols.) gave Ac_2O. Yield, 93%.

J. BISHOP TINGLE.

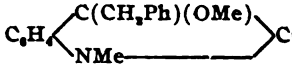
Constitution of Aliphatic Diazonium Compounds and of Hydrazoic Acid. JOHANNES THIELE. *Ber.*, 44, 3336.—In connection with his previous paper (*C. A.*, 5, 3820) T. points out that A. Angeli has already suggested that the diazonium compd. of indole may contain the group C : N ⋮ N (*C. A.*, 2, 1832) and that diazomethane and hydrazoic acid may have the formulas N ⋮ N : CH_2 and N ⋮ N : NH, resp. (*C. A.*, 5, 3404).

J. BISHOP TINGLE.

Derivatives of Dioxindole. MORITZ KOHN AND ALFONS OSTERSETZER. II Chem. Lab., Univ. Vienna and Lab., Ind. Acad., Vienna. *Monatsh.*, 32, 905–16; cf. *C. A.*, 5, 1755.—*Methoxy-1-methyl-3-phenyldioxindole*, formula (I) below, is prepared from phenyldioxindole, Me_2SO_4 and aq. KOH, leaflets from dil. MeOH, m. 83°. *Acetyl-3-phenyldioxindole*, $C_{16}H_{13}O_3N$, short rods from C_6H_6, m. 141°. *Methoxy-1-methyl-3-benzyldioxindole* (II), prepared like (I); needles from dil. MeOH, m. 97°. *3-Methyl-*

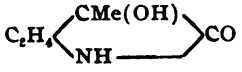


(I)

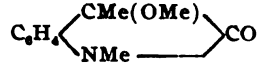


(II)

dioxindole (III), from isatin and MeMgI; lustrous, granular crystals from H_2O, m. 160°. With alkali and Me_2SO_4 it gives *methoxy-1,3-dimethyldioxindole* (IV); well-

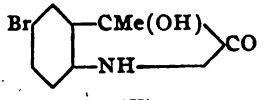


(III)

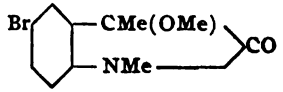


(IV)

developed, cubical crystals from dil. MeOH, m. 78.5°. *Bromo-3-methyldioxindole* (V), from (III) and Br-H_2O; white, lustrous granules from MeOH, darkens 240°, m. 256–7°. It is also formed from bromoisatin and MeMgI. *Diacetyl-3-methyldioxindole*, $C_{13}H_{13}O_4N$, leaflets and microscopic rods from dil alc., m. 125°. Yield, almost quant. *3-Phenyl-5-bromodioxindole* (see V), from 5-bromoisatin and PhMgBr; thin, lustrous



(V)



(VI)

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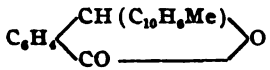
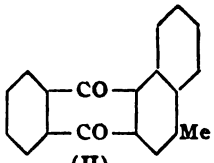
rods from alc., m. 243° (decomp.). *Methoxy-1,3-dimethyl-5-bromodioxindole* (VI), was prepared from specimens of (V) obtained by each of the methods described; needles from dil. MeOH, m. 142°. J. Bishop Tingle.

Methyl-1,2-benzanthraquinone Series. I. Roland Scholl and Walter Tritsch. *Monatsh.*, **32**, 997–1018.—*2-Metho-1-naphthyl-2'-carboxyphenyl ketone*, $MeC_{10}H_6COC_6H_4CO_2H$, is prepared from β-methylnaphthalene, phthalic anhydride and $AlCl_3$, in CS_2; aggregates of needles from dil. alc., m. 190–1°. In conc. H_2SO_4 the color is brownish red, changing quickly to violet. The acid could not be converted into an anthraquinone deriv. *Barium salt*, small, white, crystals. *4-Metho-1-naphthyl-2'-carboxyphenyl ketone*, from α-methylnaphthalene, as above; large, pale yellow crystals from C_6H_6, evolves C_6H_6 110°, m. 167–9°. In conc. H_2SO_4 the color is fuchsin-red. Yield, 90-5% of the methylnaphthalene. *Ammonium salt*,, rhombohedral crystals from dil. aq. NH_3. *Barium salt*, small, white needles. B., glacial AcOH and Zn reduce the NH_4 salt to *4-metho-1-naphthylphenylcarbinol-2'-carboxylactone*, formula (I) below; crystals

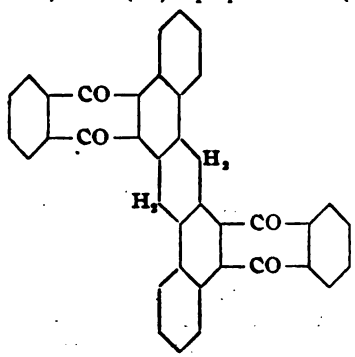


(I)

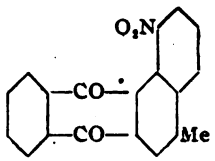


(II)

from CCl_4, m. 163–4°. Yield, about 70%. It is not decomp. by b., aq. NaOH; in conc. H_2SO_4 the color is orange-red. *4-Metho-1-naphthylphenylmethane-2'-carboxylic acid*, $MeC_{10}H_6CH_2C_6H_4CO_2H$, from the above NH_4 salt, b., aq. NaOH and Zn dust; small, white, rhombic crystals from CCl_4, m. 183–4°. Yield, good. It is also formed from (I), aq. HI (b. 127°) and yellow P. In conc. H_2SO_4 the color is reddish yellow. *3-Methyl-1,2-benzanthraquinone* (II), is best prepared from the above NH_4 salt and conc. H_2SO_4 at 60–2°; yellow needles from glacial AcOH, C_6H_6, or acetone, m. 176–7°. It may be sublimed. Yield, 66%. With aq. NaQH and Na hyposulfite it gives a red *vat dye*, which exhibits only slight affinity for unmordanted vegetable fibers. *1,2,1',2'-Dibenzanthraflavone* (III) is prepared from (II), KOH, EtOH and a little AcONa, at 160°;



(III)



(IV)

orange-red needles from $PhNO_2$. Its *vat dye*, with Na hyposulfite is yellowish red with a violet tinge, it imports yellow shades to unmordanted cotton, changing to yellowish red in air. The colors are extremely stable to chemicals, less so to light. At 320–40° (II) and KOH form a *vat dye* which gives silvery gray shades. *3-Methyl-1'-nitro-1-2-benzanthraquinone* (IV) is prepared from (II), Ac_2O, HNO_3 (d. 1.52) and glacial AcOH yellowish brown crystals from glacial AcOH, m. 248–51°. *3-Bromomethyl-1,2-benzan-*

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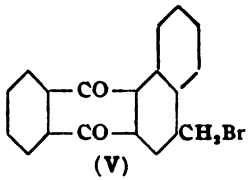
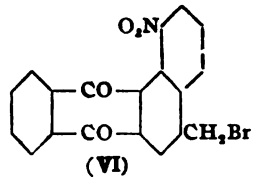
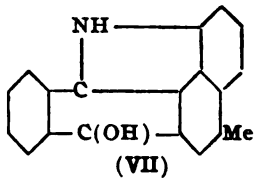
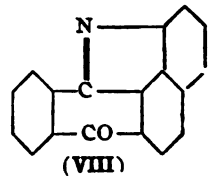
thraquinone (V), from (II), Br and glacial AcOH; yellowish green crystals from glacial AcOH, m. 219–21°. It readily eliminates Br with b., dil. MeOH KOH soln.; with alc. KOH, at 150–70°, it forms (III). *Pentabromo-3-methyl-1,2-dibenzanthraquinone*. $C_{19}H_7O_2Br_5$, from (II) and Br, at 100°; yellow powder. It gives a red *vat dye* which has but slight affinity for unmordanted vegetables fibers. When exposed to air the colors become yellowish brown. *3-Bromomethyl-1'-nitro-1,2-benzanthraquinone* (VI), from


(V)

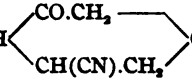

(VI)

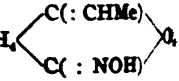
(V), as described for (IV); yellow crystals from glacial AcOH, m. 215–25° (decomp.), previously softening. *3-Methyl-O,N-dihydro-2,9-(N)-indoleanthrone* (VII), is formed from (IV) and PhN_2H_3; green and amorphous. Its solns. in neutral media are brown with a green fluorescence; in dil., aq. HCl, red; in aq. NaOH, brown this soln. dyes unmordanted cotton brown, changing to olive-green when washed and to violet-brown on exposure to air. *3-Methyl-2,9-(N)-indoleanthrone* (VIII), is formed by treatment of (VII) with air; violet-brown, cryst. powder, not m. 360°. At the ordinary temp. PhN_2H_3 reduces it to (VII); it readily oxidizes aq. SO_2 and HI. B. solvents contain-


(VII)


(VIII)

ing H_2O, preferably glacial AcOH, convert (VIII) into a *compound*, $C_{28}H_{24}O_2N_2$; almost black. Its reactions closely resemble those of (VIII). J. Bishop Tingle.

New Stereoisomeride of Cyanodihydrocarvone. Arthur Lapworth and Victor Steele. Schunck Lab., Univ. Manchester and Chem. Lab., Goldsmith's College, New Cross, London. *J. Chem. Soc.*, 99, 1877–82; *Proc. Chem. Soc.*, 27, 240.—*Neocyanodihydrocarvone*,  from b., alc., KCN and carvone; needles, m. 84°; in abs. alc. + EtONa, $[\alpha]_D^{11}$—39.00°. Alc. KOH hydrolyzes it to HCN and carvone. With EtONa and amyl nitrite it gives the lactam, m. 138–9°. *Phenylhydrazone*, needles, m. 113–6° (decomp.). *Oxime*, needles, m. 182° (darkens). Aq. HCl hydrolyzes the cyanide to a *compound*, m. 135°, *α*- and *β*-carboxylic acids (m. 142–3° and 97°, resp.) and *β-cyanodihydrocarvonecarboxylamide*, $H_2NCOC_{10}H_{14}O$; needles darkens 200°, m. 218°. J. Bishop Tingle.

Some Properties of Phenyl Isopropyl Ketone. Arthur Lapworth and Victor Steele. Schunk Lab., Univ. Manchester and Chem. Dept., Goldsmith's College, New Cross, London. *J. Chem. Soc.*, 99, 1882–7; *Proc. Chem. Soc.*, 27, 239.—A method is described for the prep. of keto-oximes; from these highly purified ketones may be regenerated. Phenyl isopropyl ketone b. 217°; d_{15}^{15} 0.9886. *Semicarbazone*, needles, m. 181°. *Oxime*, tablets, m. 94°, not 58°, or 61°. The ketone, EtONa and EtNO$_2$ give BzONa, BzOEt and acetoxime. *Ethylidenephthalideoxime*, 

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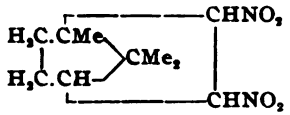
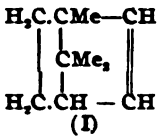
is formed from the ketone, di-Et phthalate and Na, followed by $HONH_2.HCl$ and also from ethylidenephthalide and $HONH_2$; m. 111°. J. BISHOP TINGLE.

Contributions to the Chemistry of the Terpenes. X. The Action of Chromyl Chloride, Nitrous Acid and Nitric Acid on Bornylene. GEORG G. HENDERSON AND ISIDOR M. HEILBRON. Chem. Dept., Glasgow and West of Scotland Techn. College. *J. Chem. Soc.*, 99, 1887–1901; *Proc. Chem. Soc.*, 27, 248.—Bornylene and CrO_2Cl_2 give an *additive compound*, $C_{10}H_{16}.2CrO_2Cl_2$; light brown, highly hygroscopic powder. With H_2O it gives camphenilanaldehyde, identical with that from camphene and CrO_2Cl_2. Air oxidizes it to camphenilanic and isocamphenilanic acids; this latter is also formed from the former by repeated crystn. *Isocamphenilanyl chloride*, $C_9H_{15}COCl$, b_{25} 118°. With Br it gives *bromoisocamphenilanyl chloride*, $C_9H_{14}BrCOCl$; liquid. With H_2O it gives a *compound*, $C_{10}H_{15}OBr$, needles, m. 182°. Bromoisocamphenilanic acid, $C_9H_{14}BrCO_2H$, is also formed; prisms, m. 204–5°. With Na_2CO_3 it forms an *acid*, $C_9H_{15}CO_2H$; plates, m. 147°. It reduces $KMnO_4$. *Sodium salt*, plates. A *chloroketone*, $C_{10}H_{15}OCl$, is formed with the camphenilanaldehyde; crystals, m. 165°. *Semicarbazone*, prisms, m. 234–5° (previously decomp.). The ketone and $KMnO_4$ form camphoric acid and with KOH the ketone gives camphor. Bornylene, $NaNO_2$ and AcOH forms *bornylene nitrosite*, $(C_{10}H_{16}O_3N_2)_2$; needles, m. 163°; in b. acetone, mol. wt., 346–432. With $KMnO_4$ it gives camphoric acid. Camphor quinone, a *compound*, $C_{10}H_{15}O_2N$ (prisms, m. 84–5°) and *bornylene isonitrosite* are formed with the nitrosite; green, unstable liquid. *Potassium salt*, $C_{17}H_{14}O_3N_2K$, orange powder. Bornylene and HNO, form camphoric acid and *1,2-dinitrocamphane*,

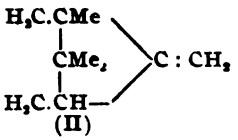


pale yellow needles m. 137°. Alk. $KMnO_4$ oxidizes it to camphoric acid. J. B. T.

Constitution of Camphene. GEORGE G. HENDERSON AND ISIDOR M. HEILBRON. *J. Chem. Soc.*, 99, 1901–6; *Proc. Chem. Soc.*, 27, 249.—Bredt's formula (I) for camphene is really that of bornylene. Camphene is probably (II) and borneol, which can be converted easily into either (I) or (II), is probably (III).



(I)



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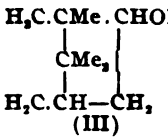

(III)

J. BISHOP TINGLE.

Experiments on the Walden Inversion. VII. Action of Phosphorus Pentachloride and of Thionyl Chloride on Optically Active Hydroxy Acids and Esters. ALEX. MCKENZIE AND FRED BARROW. Birkbeck College, London. *J. Chem. Soc.*, 99, 1910–26; *Proc. Chem. Soc.*, 27, 232.—Phenylchloroacetic acid and benzylidene chloride are formed from $SOCl_2$ and *dl*-mandelic acid. *l*-Mandelic acid gives *l*-phenylchloroacetic acid, which, with Ag_2CO_3 and H_2O, forms *d*-mandelic acid. Me *l*-mandelate gives *methyl l-phenylchloroacetate*, $PhCHClCO_2Me$; b_{11} 123–6°; d_4^{15} 1.213; $[\alpha]_D^{15}$ —86.7°. It gave *l*-phenylchloroacetic acid. From the ester and MeONa was obtained *dl*-phenylmethoxyacetic acid. Et *l*-mandelate gave *ethyl l-phenylchloroacetate*; b_{14} 132–3°; $d_4^{16.4}$ 1.162; $[\alpha]_D^{16.4}$ —64.0°. It gave *l*-phenylchloroacetic acid. The ester and EtONa gave *dl*-phenylethoxyacetic acid. *l*-Malic acid and $SOCl_2$ form *d*-chlorosuccinic acid. Et *l*-malate produced *ethyl d-chlorosuccinate*, $EtO_2CCH_2CHClCO_2Et$; b_{14} 124°; $d_4^{19.5}$ 1.152; $[\alpha]_D^{19.8}$ 32.7°.

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Et *d*-tartrate and $SOCl_2$ give $OS\langle^{O.CHCO_2Et}_{O.CHCO_2Et}$ from which *d*-tartaric acid was produced. *Ethyl d,α-hydroxy-β-phenylpropionate*, $PhCH_2CH(OH)CO_2Et$, b_3 152–4°; d_4^{17} 1.105; $[\alpha]_D^{17}$ 7.6°; m. 46–7°; in alc. $[\alpha]_D^{18.5}$ —4.8°; in C_6H_6, $[\alpha]_D^{17.5}$ 22.5°; in acetone, $[\alpha]_D^{17.5}$ 13.6°. *Ethyl l,α-hydroxy-β-phenylpropionate* b_{28} 159–60°; m. 46–7°; in C_6H_6 $[\alpha]_D^{13}$ —22.6°. With PCl_5 the product is *l*-rotatory and the resulting Ca salt *d*-rotatory, in H_2O. The *d*-ester gave a similar result. The *l*-acid and PCl_5 gave a product *l*-rotatory in alc. Et *l,α*-hydroxy-*β*-phenylpropionate and $SOCl_2$ gave a *d*-rotatory product which formed a Ca salt that was *l*-rotatory in H_2O. *d,β*-Hydroxy-*β*-phenylpropionic acid and conc. HCl gave a chloro acid having $[\alpha]_D$ —4.6°, in alc. With H_2O a hydroxy acid had α_D 0.29°, in alc. With the *l,β*-hydroxy-*β*-phenylpropionic acid and HCl the products had $[\alpha]_D$ 6.5–21.8°. *d,β*-Hydroxy-*β*-phenylpropionic acid and PCl_5 gave a *l*-rotatory chloro acid, which, with moist Et_2O gave a *l*-rotatory compd. With $SOCl_2$, instead of PCl_5, the products are cinnamic and *dl*- and *d,β*-chloro-*β*-phenylpropionic acids. B. H_2O converts these latter into *dl*- and *l,β*-hydroxy-*β*-phenylpropionic acids. *l,β*-Hydroxy-*β*-phenylpropionic acid and $SOCl_2$ formed cinnamic and *dl*- and *l,β*-chloro-*β*-phenylpropionic acids, from which, with H_2O, some *d*-hydroxy acid was produced. J. Bishop Tingle.

Relation between Residual Affinity and Chemical Constitution. II. Certain Compounds of Nitrogen. Hans T. Clarke. Org. Chem. Lab., Univ. Coll., London. *J. Chem. Soc.*, 99, 1927–37; *Proc. Chem. Soc.*, 27, 243; cf. *C. A.*, 4, 2108.—*Methylenedipiperidine* from piperidine and the condensation compd. of HCHO and $NaHSO_3$; b. 235°; $d_4^{16.5}$ 0.9168; M_α 56.30. *Ethylenedipiperidine* from ethylene bromide and piperidine; b. 263°; $d_4^{16.5}$ 0.9236; M_α 61.05. Trimethylenedipiperidine, form trimethlyene bromide and piperidine, b. 278°; d_4^{17} 0.9175; M_α 65.62. *Sym.-dimethyldiisoamylethylenediamine* from ethylene bromide and methylisoamylamine; b_{18} 130–1°, $d_4^{19.2}$ 0.8083; M_α 74.12. *Diisoamylpiperazine*, from isoamylamine and ethylene bromide; b_{18} 136–7°; d_4^{20} 0.83603; M_α 72.46. *Benzylpiperidine*, from benzyl chloride and piperidine; b. 245°; d_4^{16} 0.9625; M_α 55.65. *Sym.-dibenzyldimethylethylenediamine* from ethylene bromide and benzylmethylamine; b_{10} 198°; $d_4^{18.8}$ 0.9717; M_α 85.52. *Dibenzylpiperazine*, from benzyl chloride and piperazine and also from ethylene bromide and benzylamine; m. 92°; in alc., M_α 83.88; in C_6H_6, M_α 83.72–83.90. *Sym.-diphenyldimethylethylenediamine*, from MeNHPh and ethylene bromide; m. 47.5°; in C_6H_6, M_α 78.54–78.77. *Diphenylpiperazine*, from ethylene bromide and $PhNH_2$; m. 163; in C_6H_6, M_α 77.42–77.63. It is concluded that N ats. in *N*-substitute piperazines exert a mutual influence which occasions optical exaltation. Trivalent N ats. in the "critical" positions in normal chain compds. exert a similar mutual influence, but no optical anomaly has been detected in such substances. The mutual influence of such N ats. increases their reactivity towards organic halogen compds. J. Bishop Tingle.

Absorption Spectra of the Nitration Products of Dimethyl-*p*-toluidine. Gilbert T. Morgan and Arthur Clayton. Royal Col. of Sci., S. Kensington, London. *J. Chem. Soc.*, 99, 1941–9; *Proc. Chem. Soc.*, 27, 233; cf. *C. A.*, 5, 1600.—*2,3,6-Trinitrodimethyl-p-toluidine*, $Me_2NC_6HMe(NO_2)_3$, from 2,6-dinitrodimethyl-*p*-toluidine, scarlet needles, or plates, m. 137°. *2,3,6-Trinitro-p-tolylmethylnitrosoamine*, $ONNMeC_6HMe(NO_2)_3$, yellow needles, m. 162–3°. *2,5-Dinitro-p-tolylmethylnitrosoamine*, from 2,5-dinitrodimethyl-*p*-toluidine, is identical with a compd., m. 126–7° from methyl-*p*-toluidine. 3,5-Dinitro-*p*-tolylmethylnitroso- and nitroamines from 3,5-dinitrodimethyl-*p*-toluidine. The absorption spectra of the nitrated dimethyl-*p*-toluidines and *p*-tolylmethylnitrosoamines were examd. in abs. alc.; the results are given in curves. With 1 NO_2 in the ring, variation in the orientation does not modify the

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spectrum, greatly, but, in general, the band of the *o*- and *p*-derivs. is more persistent than that of the *m*-compd. The effect of a second NO_2 depends largely on its position in relation to the aminic radicle and to the first NO_2. The exceptional form of the absorption curves of 2,6- and 3,5-dinitrodimethyl-*p*-toluidine is explained in terms of residual affinity. J. Bishop Tingle.

Chlorophyll Group (XI) Allochlorophyllan (Marchlewski, Marzalek). 11D. Molecular Refraction of Nitrogen Compounds (Duval). 2. Steric Influence—Formation of Anilides (Davis). 2. Structure of Organic Compounds and their Equilibria (McBain, Davis). 2. Reactions of Aromatic Aldehydes (Conzetti). 25.

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11. BIOLOGICAL CHEMISTRY.

William J. Gies.

A. GENERAL.

Frank P. Underhill.

Oxyprotosulfonic Acid. I. J. Buraczewski and L. Krauze. Krakau. *Z. physiol. Chem.*, 76, 37–43.—Oxyprotosulfonic acid, prepared according to the method in *C. A.*, 5, 2108, was sepd. into α-, β-, γ_1- and γ_2-oxyprotosulfonic acids. The α acid is obtained from the residue which remains after treating the original acid with b. glacial AcOH. From the portion sol. in AcOH the β acid crystallizes on cooling, the γ acids remaining in soln. Casein does not yield any β acid. In chem. behavior the various fractions do not differ from the original oxyprotosulfonic acid except in solubility and in the quantity of loosely combined S (Pb reaction). The C, H, N, and S content of the acids obtained from the several sources are not identical. G. M. Meyer.

Action of Hydrogen Ions on Invertase. Leonor Michaelis and Heinrich Davidsohn. Krankenhaus am Urban, Berlin. *Biochem. Z.*, 35, 386–412.—Invertase is an amphoteric electrolyte. The acid dissociation const. is 2.10^{-7}, the basic dissociation const. 10^{-12}. Only the undissociated portion of the invertase inverts saccharose. The optimum H^+ conc. is therefore that of the isoelec. point of invertase, which covers a zone from 10^{-5} to 10^{-3}. The anions and cations are both without fermentative activity, and the cations are readily destroyed. D. D. Van Slyke.

Ricinus Lipase. Y. W. Jalander. Pharm. Inst., Univ. Leipzig. *Biochem. Z.*, 36, 435–76.—The enzyme was prepared for quant. expts. by grinding up dry *Ricinus* seeds with 1.25 parts of cottonseed oil and centrifugating the mixts. The sediment was taken up with an equal vol. of petroleum ether, allowed to settle, then freed from oil by repeated extraction with petroleum ether. The enzyme, a white powder, retains its activity for an indefinit time. When the enzyme powder was suspended in oil moistened with small amts. of 0.1 *N* AcOH, the action could be observed under the microscope. The particles absorb water and swell; saponification follows, and (in case of cotton oil) stearic acid crystallizes about the droplets surrounding the enzyme particles. The max. sapon. with triolein was obtained when for 1 g. of fat 0.005–0.01 g. of enzyme was used, and 0.5–2.0 g. of AcOH, the strength of which might vary from 0.1 *N* to 0.001 *N* without affecting the completeness of the sapon. More rapid sapon. was obtained when the emulsions were shaken continuously. Free AcOH acts as the activator of the enzyme. When shaken with 0.1 *N* acid, then completely dried in vacuum over H_2SO_4 and mixed with water and triolein, it exhibits max. activity. Previous treatment with water alone does not activate. The enzyme, although permanent in the dry state, gradually loses its activity in the presence of neutral fats, of water, or of dil. AcOH. The amt. of enzyme present affects the end p. of the sapon.; the greater the proportion of lipase, up to a certain conc.,

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the greater the % of the oil saponified. The max. sapon. obtainable with a given prep. was 89%. When oleic acid, glycerol and 0.01 *N* AcOH were mixed in corresponding proportions a reversion of the lipolysis occurred, 11% of the fatty acid being esterified; the end conditions of the system were the same as when the reaction began with neutral fat. From a mixt. of 40 g. oleic acid, 100 g. glycerol, and 0.5 g. lipase allowed to stand 12 days, 8.4 g. of triolein were actually isolated. The reaction rate follows the monomol. equation only for a short time, 1 or 2 hrs., of the reaction. For the entire course of the reaction, following several days, the equation $k = x/tm$ (x being the proportion of fat saponified, t the duration of the reaction, and m a const. for a given reaction) gives better consts., m varying from 0.57–0.70. D. D. V. S.

The Formation of Nitrous Acid in Plant and Animal Cells. MAZÉ. *Compt. rend.*, 153, 357–60.—It was necessary to work with only such plant juices as had been freed from all microörganisms, reducing substances and from nitrates before testing for HNO_2. For this purpose the fresh juice can be pptd. with 95% EtOH, filtered and EtOH driven off from the ppt. at 30° *in vacuo* or filtered through a Chamberland filter, and preserved in a steril vessel; or the juice can be coagulated at 100°, the clear supernatant liquid giving the HNO_2 test after a few days. Under these conditions HNO_2 was found in the juice of young pea seedlings, some fungi, in the blood and urin of healthy persons. The urin of an advanced tuberculous patient contained no HNO_2. The formation of HNO_2 is a general property of the living cell. H. A. SPOEHR.

Physico-chemical Investigations on Animal Liquids. VIII. Chemical Reaction of the Urin. G. QUAGLIARIELLO. Ist. fisiol. r. univ. Napoli. *Atti accad. Lincei*, 20, II, 659–66; cf. *C. A.*, 5, 3589.—The urin of young, healthy individuals excreted at different hrs. of the day was examd. The H^+ ion conc. is $2–82.6 \times 10^{-7}$ g. equivs. per l., the potential acidity 0.031–0.055, the potential alkalinity 0.013–0.042, the ratio pot. acidity : pot. alk. 0.9–2.6, the neutralizing power 0.045–0.106, the H_2PO_4 0.0113–0.0269 mols. per l., the % of phosphoric acid as MH_2PO_4 50.3–97.8. Only about $^1/_4$ of the neutralizing power corresponds to the phosphates. Q. concludes that human urin has an acid reaction, varying widely from individual to individual and in the same person at different hrs.; simple titration against phenolph. is absolutely without practical or theoretical significance; the r tio pot. acidity : pot. alk. varies directly as the H^+ ion conc.; the neutralizing power is about 4 times greater than that of a soln. of phosphates of the same conc. as that in the urin and is due to the presence of free acids and possibly of substances generally considered as nonelectrolytes but which may be very weak, perhaps amphoteric, electrolytes. CHAS. A. ROUILLER.

Aseptic Glucolysis in the Blood. A. SLOSSE. Inst. Solvay, Bruxelles. *Arch. intern. physiol.*, 11, 153–90.—Expts. with the blood of dogs and horses showed that under aseptic conditions glucolysis taking place in the blood was not a process of alc. fermentation, since no alc. or CO_2 could be detected. The glucolysis took place according to the following scheme: 1 mol. glucose ⟶ 2 mols. lactic acid ⟶ 1 mol. AcOH and 1 mol. HCOOH ⟶ 1 mol. AcOH and CO and H_2O. The fatty acid and CO did not come directly from the glucose, but from the lactic acid formed by cleavage of the glucose. H. B. LEWIS.

New Work in Physiological Chemistry. P. RONA. Berlin. *Med. Klinik*, 7, 1990–1.—A review on proteins, ferments and salt actions. P. J. H.

Do the Blood Corpuscles Show Individual Variations when Hemolyzed? LUDWIG DIENES. Hygien. Inst., Univ. Budapest. *Biochem. Z.*, 33, 268–74.—Blood corpuscles were subjected to partial hemolysis in hypertonic solns., and the relation of hemoglobin to total solids in the undissolved cells detd. It was practically const. at 50% of the total solids. This indicates that partial hemolysis does not consist in a loss of hemoglobin from all of the cells, but rather that some of the cells undergo complete hemolysis,

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the remainder losing none of their hemoglobin and maintaining their comp. unchanged. D. D. VAN SLYKE.

The Question of Individual Variation in the Red Blood Cells in Hemolysis. STEPHEN RUSZNYAK. Path.-Anat. Inst., Budapest. *Biochem. Z.*, 36, 394–6; cf. preceding abstr. —R. points out that Abderhalden has found 77% of hemoglobin in the dry substance of the cells, and that using this figure, the results of Dienes lead equally to the conclusion that the cells give off their hemoglobin gradually on hemolysis. D. D. V. S.

B. METHODS AND APPARATUS.

S. R. BENEDICT.

Colloidal Chemistry of Histological Silver Staining. R. E. LIESEGANG. *Koll. Chem. Beihefte*, 3, 1–46 (1911); through *J. Chem. Soc.*, 100, II, 971.—Cajal's method of staining nerve tissue by means of a Ag soln. has been examd. from the colloido-chem. point of view, and the conditions are formulated which must be observed in order to ensure satisfactory preps. A comparison is made between the various phases of the staining process and those involved in the development, toning, and fixing of a photographic plate. E. J. C.

Attempts to Improve the General Method for the Quantitative Determination of Thiocyanate in Saliva. ELMER W. BAKER AND WM. J. GIES. Lab. Biol. Chem., Columbia Univ. *J. Allied (Dental) Socs.*, 6, 289–96.—$Fe(SCN)_3$ very readily passes from ether soln. through rubber to ether. This property seemed to offer a particularly accurate method for the quant. detn. of thiocyanate in saliva. Efforts to sep. $Fe(SCN)_3$ quant. from saliva-HCl-$FeCl_3$ mixts. with ether or alc.-ether by dialysis through rubber membranes gave completely negative results. It is probable that Fe combines with or chemically modifies rubber under such conditions.

ALFRED P. LOTHROP.

The Oxygen-carrying Properties of Blood Warmed to Different Temperatures. L. v. LIEBERMANN AND FRANZ WUSNER. Budapest and Karlsbrunn. *Biochem. Z.*, 35, 363–7.—The O-carrying power (guaiacol reaction) of defibrinated human blood or hog blood is not perceptibly influenced if the blood has been heated between 17 and 50°. The time of appearance and distinctive blue coloration is from 10 to 20 and 50 to 70 sec. Heating beyond 50° and up to 70° hastens the reaction. This is probably due to an increase in surface action of the O-carrying substance, made possible by the disintegration of the blood cells. G. M. MEYER.

Detection of Small Amounts of Arsenic in the Urin, Blood and other Organic Materials. GEORG LOCKEMANN. Kgl. Inst. f. Infektionskrankheiten, Berlin. *Biochem. Z.*, 35, 478–93.—The organic matter is destroyed by treatment with a small amt. of a mixt. of 9 parts fuming HNO_3 and 1 part H_2SO_4. The conc. product is then fused with a mixt. of KNO_3 and $NaNO_3$. The melt is dissolved, and the As pptd. by adsorption with $Fe(OH)_3$. For this purpose a soln. of $FeNH_4(SO_4)_2$, of which 10 cc. yield 0.5 g. $Fe(OH)_3$ is added, and the Fe is pptd. by addition of only a slight excess of an equivalent NH_3 soln. 10 cc. of the Fe soln. suffice to completely adsorb from 100 cc. of soln. 25 mg. of As at 25°, or 35 mg. at 0°, the adsorption being more efficient in the cold. For 0.5 l. of urin 25 cc. of Fe soln. are used; a 2nd pptn. is then made in the filtrate with 15 cc. in order to ascertain whether the first was complete, and a 3rd or 4th pptn. with smaller amts. may also be made. The Fe ppt. is dissolved in 20% H_2SO_4 and tested for As in the Marsh app. The amt. of As is estd. approx. by comparison of the mirror obtained with that yielded by solns. containing known amts. of As. Preferably the amt. of soln. used should contain not over 0.015 mg. of As. In case the nitrates used for destroying the organic matter are found to contain As, the latter is removed by pptn. with $Fe(OH)_3$ in the above manner.

D. D. VAN SLYKE.

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Note on a Possible Fallacy in Fleitmann's Test. WALTER J. DILLING. Aberdeen Univ. *Pharm. J.*, 87, 811.—A specimen of urin containing only a subtoxic dose of As showed apparent reduction of $AgNO_3$ 6 weeks after the poison was taken, while Reinsch and Marsh tests gave negative results. Slight reduction is effected even by the stream of b. dist. H_2O impinging on the $AgNO_3$. When normal urin is added to the Zn and NaOH in the test tube and the liquid boiled until steam issues from the tube, strong reduction takes place which might be mistaken as indicating As. This is due to uric acid. Urates, caffeine and alcobromine have the same effect. In F.'s test the liquid should be heated only until bubbles of H are given off; then the paper cap containing the $AgNO_3$ spot may be placed over the mouth of the test tube.
S. WALDBOTT.

The Sulfur Balance in Metabolism. A. E. TAYLOR. *Proc. Am. Soc. Biol. Chem.*, 2, 3, 4; through *J. Biol. Chem.*, 9, IX, X.—Results are not considered trustworthy.
WM. P. GARRETY.

C. BACTERIOLOGY.

ERNEST D. CLARK.

The Bactericidal Action of Silver Preparations in Media Containing Salt (NaCl). OSCAR GROS. Univ. Leipzig. *Münch. med. Wochschr.*, 58, 2659–62.—$AgNO_3$, protargol, albargin, argentamin, novargan, ichtargan and sophol were tested. The disinfecting action of silver salts in the presence of NaCl depends upon two factors: (1) The action of the Ag ion present and (2) the soln. of the AgCl. The first factor is the same with all Ag preps. and cannot be influenced, while the second can, different values being found for the different preps. tested. H. J. CORPER.

Intermediate Products in Alcoholic Fermentation. G. BRUHNS. *Centr. Zuckerind.*, 20, 395–6.—Recent expts. on this subject and on the catabolism of sugars in the animal body are reviewed. Since HCOOH has been proved to be an intermediate product both in the alc. fermentation and in the decomp. of sugars in the animal body, B. suggests the possibility that the parallelism between these 2 processes may be traced further, and that glucuronic acid may be a primary decomp. product in the alc. fermentation as it is now known to be in the oxidation of the animal body. Recent work of Schade, Franzen and Steppuhn and Adolf Jolles support the view that CH_3CHO and HCOOH are intermediate products in the alc. fermentation from which alc. and CO_2 are formed. P. A. YODER.

Biological and Toxicological Studies upon Penicillium puberulum, Bainier. C. L. ALSBERG AND O. F. BLACK. Bur. Plant Ind., Wash. *Proc. Soc. Exp. Biol. Med.*, 9, 6.—*Penicillium puberulum*, Bainier when grown upon Raulin's soln., in pure culture, produces a new organic acid which has been termed penicillic acid. From the analyses, mol. wt. detns. and other data, it seems probable that this acid belongs to the same general class of compds. as are found in lichens, and termed lichen acids. This suggests that the lichen acids are the product of the fungus metabolism, and not that of the algae. V. C. MYERS.

Origin of Mineral Deposits by Bacteria (BREGER). 8. Bacterial Content of Distilled Water (MÜLLER). 17. Antiseptic Effect of Creosote Oil (WEISS). 22.

D. BOTANY.

CARL L. ALSBERG.

Chemical Ecology of Plants and Drugs. JOS. NOVAK. Prague. *Cas. Cesk. Lékárn*, 30, 641–2.—Certain substances found in growing plants act as preservatives for them. N. was able to show that K bioxalate acts thus in various species of *Rumex*. Other examples are cited from the literature. P. J. HANZLIK.

Researches in Plant Physiology. P. MAZÉ. *Ann. inst. Pasteur.*, 25, 705–38.—

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Maize grown in sterilized Seine water developed acidity therein when $(NH_4)_2SO_4$ was added and alkalinity when $NaNO_3$ was added. Dextrose, levulose and malates are excreted by the roots. Amylase and sucrase were not found in the nutrient solns. The stomata also excrete minerals in soln., especially during rapid growth, but not during seed formation. The excretions from the stomata are not proportional to the conc. of the nutrient solns. As a N food NH_4NO_3 was found more efficient, for the same wt. of N, than NH_4Cl, $NaNO_3$ or $(NH_4)_2SO_4$. F. C. Koch.

Contribution to our Knowledge of Plant Phosphatides. Vladimir Njegovan. *Z. physiol. Chem.*, 76, 1–26.—The alc.-sol. phosphatide obtained from *Lupinus albus* L. was investigated. The ratio P : N in nearly all the preps. was 1 : 1; in one it was 1.242 : 1. Glycerophosphoric acid was sepd. as the Ba salt. Choline was absent in one prep.; instead a new base, *vidine*, $C_9H_{20}N_2O_2$, was obtained. *Chloroaurate*, $C_9H_{22}N_2O_3(AuCl_3HCl)_2$, m. 269–72° (also m. 252–8°). *Chloroplatinate*, $C_9H_{22}N_2O_2PtCl_6 \cdot H_2O$, triclinic crystals, m. 250–2°. Carbohydrates are only present in the phosphatides in small amts., which vary according to the method of prep. That the carbohydrate should pass into ether soln. with the rest of the mol. can only be explained by adsorption. N. expresses the view that the carbohydrates are not mol. constituents of the phosphatides. Besides palmitic and stearic acids an unsatd. *fatty acid* was obtained which could not be further identified. G. M. Meyer.

Formation of Hydrocyanic Acid in the Germination of Seeds. II. C. Ravenna and C. Vecchi. Lab. chim. agrar. r. univ. Bologna. *Atti accad. Lincei*, 20, II, 491–5; cf. *C. A.*, 5, 1633.—Comparative expts. on seeds germinated in the presence of pure H_2O, of NH_4Cl and of NH_4Cl and glucose showed that the % of HCN increases least in the first case, most in the last, confirming the views earlier proposed. In the case of seeds of *Sorghum vulgare*, HCN is not formed until the appearance of chlorophyll, even in the presence of NH_4Cl. Chas. A. Rouiller.

Origin and Function of Calcium Oxalate in Plants. Ioannes Politis. *Atti accad. Lincei*, 20, II, 528–34; cf. *Atti ist. bot. Pavia*, 14.—P. concludes from his work that oxalic acid and Ca oxalate originate in the cells in which the salt is found crystallized; the oxalic acid is formed from the glycogen or the amyloid by oxidation. The acid must fulfil a definit function, such as the elimination of superfluous Ca or the formation of Ca oxalate crystals having a specific biological influence, contrary to the hypotheses of Groom, Böhm and Schimper, according to whom the function of the Ca oxalate formation is the elimination of the toxic oxalic acid. C. A. Rouiller.

Note on the Action of Strychnine upon some Somatic Cells. Helen P. Kemp. London. *Ann. of Bot.*, 25, 1069–75.—Somatic tissues of the pea and bean were treated with solns. of H_2SO_4 and HCl salts of strychnine. Although the presence of the alkaloid in the stems was established, no definit physiological response was observed; only when used in sufficient strength, 0.5%, a general disturbance of metabolism results, from which recovery is doubtful. H. A. Spoehr.

The Variation of Dry Substance, Nitrogen and Mineral Matter in Trees during a Vegetation Period. E. Ramann and H. Bauer. *Jahr. wiss. Bot.*, 50, 67–83. H. A. S.

The Variation of Mineral Matter in Leaves during Night and Day. E. Ramann. *Jahr. wiss. Bot.*, 50, 84–91.—In leaves of trees Ca increases during the night and decreases during the day. This phenomenon is brought into relation with the transport of assimilation products, which is greater during the day, when organic substances are being formed, than at night. H. A. Spoehr.

The Chlorophyll Group. XI. Allochlorophyllan and the Duality of the Chlorophyllans. L. Marchlewski and J. Marzalek. Cracow. *Biochem. Z.*, 35, 412–33.

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—Chlorophyll from the leaves of different species and even from leaves of the same species gathered at different seasons or from different plants or localities, show different optical properties. This is due to the fact that the chlorophyll consists of a mixt. of 2 substances, chlorophyllan and allochlorophyllan, the varying proportions of which cause the variation in the properties of the crude chlorophyll. Allochlorophyllan was prepared from crude chlorophyll by pptn. of the alc. soln. with $Zn(OH)_2$ and CO_2, and purified by pptn. with alc. from conc. $CHCl_3$ soln. Preps. from different sources proved identical. D. D. VAN SLYKE.

E. NUTRITION.

PHILIP B. HAWK.

NORMAL.

The Metabolism and Energy Transformations of Healthy Men during Rest. F. G. BENEDICT AND T. M. CARPENTER. *Carnegie Inst. Wash. Pub.*, 126; cf. *C. A.*, 5, 932.—Detailed data from 80 expts. with the respiration calorimeter, methods, changes in body wt., insensible perspiration, body temp. and pulse rate, water vaporized from lungs and skin, CO_2 elimination, O consumption, heat elimination, the relations between the various factors of metabolism, and variations in metabolism due to variations in physical characteristics, age, muscular activity, sex, and occupation are discussed. Tentative factors for computation of metabolism during the performance of common body movements such as dressing, undressing, standing, sitting, etc., are given. The av. values follow: Man, sleeping (wt. 66.6 kg.), eliminated 23 g. of CO_2, utilized 21 g. of O, and produced 71 cal. of heat per hr.; man, at rest, awake, sitting up (wt. 64.5 kg.), eliminated 33 g. of CO_2, utilized 27 g. of O, and produced 97 cals. of heat per hr.; man at rest, standing, same wt., eliminated 37 g. of CO_2, utilized 31 g. of O, and produced 114 cals. of heat per hr.; man at very severe muscular exercize, same wt., eliminated 248 g. of CO_2, utilized 213 g. of O, and produced 653 cals. of heat per hr. These results are to be considered simply as indicating the normal metabolism of healthy young men at rest and under several conditions of muscular activity. The variations from the normal exhibited by the individual can be seen by an exam. of the tables in the original. Approximate values that may prove of practical use can be obtained by means of some of the factors outlined in this report. With more accurate and improved calorimeters there should be, in the course of a few years, the addition of many factors at present unknown. WM. P. GARRETY.

The Banana as a Food. K. THOMAS. Physiol. Inst., Univ. Berlin. *Arch. Physiol.*, 1910, *Supplementband*, 29–38.—The utiliz tion of bananas in various stages of ripeness was studied in man. With ripe fruit 9–11% of the energy intake was lost; in half ripe, starch rich, uncooked fruit, the energy loss varied up to as high as 23%. The N needs of the body could not be satisfied by bananas alone. H. B. LEWIS.

The Urin of Women under Normal Conditions, with Special Reference to the Presence of Creatine. R. A. KRAUSE. Edinburgh Univ. *Quart. J. Exp. Physiol.*, 4, 293–304.—Creatine is present in the urin of women immediately after menstruation; it may or may not be present during the intermenstrual period. In women, creatine is therefore not an abnormal urinary constituent. Creatine is present in the urin of women during pregnancy. So-called "post-partum creatinuria" is only a temporary increase in the creatine excretion which occurs throughout pregnancy. After menstruation, the distribution of the N in the urin is changed. There is an increase in the excretion of NH_3 and of undetd. N, a decrease in the excretion of $CO(NH_2)_2$. A similar change takes place during pregnancy. Observations on a bitch during the oestrous and anoestrous periods confirm the existence of a correlation between creatinuria and the female sexual cycle. V. C. MYERS.

The Role of the Salts of Human Milk in Nourishment during the Suckling Period

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and Early Childhood. HANS FRIEDENTHAL. Univ. Berl. *Münch. med. Wochschr.*, 58, 2385–7.—F. discusses the importance of salts in human milk and gives in table orm the salt content (anions and cations) in human, cow, pig, dog and rabbit milk. He also illustrates by charts the comparative proportion of constituents in various milks.

H. J. CORPER.

The Development of Acidity in Cow Milk and its Relation to Time and Temperature. R. VINCENT. Infant's Hospital, London. *Glasgow Med. J.*, 76, 421–30.—The development of acidity in pure milk during the first 8 hrs. of incubation at blood temp. (the time required to pass through the alimentary tract of an infant) was very slight and the amt. of acid produced was well within the normal physiological limits. Com. milk showed a higher degree of acidity after incubation for 24 hrs. at 19° (70–80 cc. 0.1 *N* NaOH to titrate 100 cc. milk) than did pure milk (15–20 cc. 0.1 *N* NaOH).

H. B. LEWIS.

Distribution of Nitrogen in the Urin of the New-born. S. SIMON. Univ. Kinderklinik, München. *Z. Kinderheilk.*, 2, 1; through *Zentr. Biochem. Biophys.*, 12, 138–9. —All healthy infants in the first days after birth show a high total and body N excretion. At the end of the first week the body N excretion becomes normal. The unusual content of the first days is due to the fact that about 12% of non-hydrolyzed polypeptides are excreted. With the ability to decompose this the % of excreted amino acids increases. The NH_3 excretion also increases while the oxyproteic acids remain about 10% of the total N in the urin of the new-born as is also found in infants somewhat older if suckled.

I. K. PHELPS.

ABNORMAL.

The Physiological Significance of Calcium Starvation in Nursing Children in the First Year. W. DIBBELT. Tübingen. *Ber. klin. Wochschr.*, 48, 2062–4.—Results of Thomas on dogs and cats (*C. A.*, 6, 103) show that the ash content of the young decreases in % during the first period when the wt. is doubled. On this basis D. points out that the older calcs., *i. e.*, for every 100 g. increase in wt. of infants a CaO increase of 1.9 g. is necessary, do not hold. So also histological exam. of bones in the new born and in infants 2 yrs. old shows the marked change from the close, compact marrow spaces to the enlarged porous ones in the diaphyses. To bring about this change a resorption of bone tissue is necessary and this process is facilitated by a food of low Ca content. The apparent low Ca content of human milk is a physiological necessity in the first yr. of the infant.

F. C. KOCH.

The Active Factors in the Oats Cure of Diabetes Mellitus. O. BAUMGARTEN AND G. GRUND. Med. Klin. in Halle a. S. *Deut. Arch. klin. Med.*, 104, 168–206.—Four fractions were sepd. by centrifuging a suspension of oatmeal in dil. acid soln. The carbohydrate in these different fractions were 80.3, 49.71, 28.99 and 23.07%, resp. In many cases the oat starch did not reduce the glucosuria when compared with wheat and potato starch. In cases where the whole oatmeal appeared to be beneficial, the various fractions were not as effective as the entire oatmeal. No uniform action could be demonstrated as to the different effects of oatmeal, wheat or potato starch on the carbohydrate content of the feces. Similarly, feeding of oatmeal or oat starch had no other effect on starved phlorhizin diabetic dogs as to fatty degeneration of the liver, than that of wheat starch. In neither case did the fat content of the dried liver rize over 21.55%, the averages being 12.3, 13.7, and 18.32, resp.

F. C. KOCH.

Researches on the Action of Iron. ALFRED ZAHN. Med. Polikl. z. Freiburg i. B. *Deut. Arch. klin. Med.*, 104, 245–61.—Rabbits were rendered anemic by bleeding. Such rabbits, fed with bran and oats and with fresh green food, such as cabbage, clover and grass in abundance, recovered equally as well or even slightly better than when 4–6 mg. per day of Fe as ferric citrate, Na ferric tartrate or as liq. ferr. albumin

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were added to the same food. Rapidity of recovery was measured by body wt. and by hemoglobin and erythrocyte content of the blood. F. C. KOCH.

Meat Intoxication of Eck Fistula Animals. The Condition of Alkalosis. F. FISCHLER. Med. Klinik Heidelberg. *Deut. Arch. klin. Med.*, 104, 300–20.—Results on 76 Eck fistula dogs indicate that it is better first to immunize the animals against trypsin before operating. Such immunized animals live longer, show no histological changes in the liver and do not lose in wt. Dogs not immunized show the effects of meat intoxication more readily, rapidly lose in wt., cannot be "cured," and show decided atrophy and necrosis of the liver, similar to yellow atrophy of the liver. The intoxication brought about by a meat diet can be prevented by using a fat dog, by plenty of fat food, by feeding H_3PO_4 and in part by first immunizing with trypsin. The meat intoxication is due to a condition of alkalosis, the alkalosis probably being brought about by "NH_3 salts." The normally active liver upholds the equil. between acid and base; hyperfunctioning of the liver leads to acidosis and hypofunctioning to alkalosis. F. C. KOCH.

The Course of General Metabolism in Eck Fistula Animals. E. GRAFE AND F. FISCHLER. Med. Klin. Heidelberg. *Deut. Arch. klin. Med.*, 104, 321–39.—Four Eck fistula dogs were prepared according to the method of Fischler and Schröder (*Arch. exp. Path. Pharm.*, 61, 428) and respiration expts. conducted in the Grafe and Graham app. (*Z. physiol. Chem.*, 73, 1). In the first 1 to 5 hrs. after taking carbohydrate food, the operated animals show a still higher rate of oxidation than the normal, as indicated by the O consumed and CO_2 produced. Fat production was not seriously interfered with as the respiratory quotient rose to 1.2. Protein food in the Eck fistula dog is followed by a slower rise in the increased oxidation and a delayed return to the normal in the animal without food for a period of 16–20 hrs. In one case of severe meat intoxication the increased O consumption continued for 10–12 hrs. longer than in the normal dogs. The production of heat was 36% over and above that of the heat of combustion of the protein fed, while in the normal animals the results of Rubner, Atwater, Magnus-Levy and Zuntz indicated this value to be 17% over the heat of combustion of the protein fed. The authors consider the condition of the blood in the operated animals as one which hastens general body oxidations. F. C. KOCH.

Reduced Diet in Severe Cases of Diabetes Mellitus. E. BERNOULLI. Riehen. *Cor. Blatt Schweiz. Aerzte*, 41, 1276–80.—A clinical report with some urinary findings. P. J. HANZLIK.

The Metabolism in a Case of Idiopathic Osteopsathyrosis. A. BOOKMAN. Lab. of Physiol. Chem., Mt. Sinai Hosp., New York. *Arch. Intern. Med.*, 8, 675–83.—The results of a metabolism expt. extending over a period of 6 days indicate that in idiopathic osteopsathyrosis there is a slight loss of Mg and a marked loss of Ca by the body. The Ca metabolism showed a minus balance of 4.94 g. (calc. as CaO) in the 6-day period. Coincident with the loss of Ca and Mg there was a retention of N, S, and P. The output of preformed creatinine was normal, representing an av. of about 0.3 g. N per day. W. C. ROSE.

Protein Metabolism in the Dog. II. Nitrogen and Sulfur Metabolism in Hunger and during Insufficient Nourishment with Protein, Carbohydrates and Fats. CHARLES G. L. WOLF AND EMIL OSTERBERG. Cornell Univ. Med. College, New York. *Biochem. Z.*, 35, 329–62.—Dogs were starved for 8 days, then fed diets of either proteins, fats, or carbohydrates. During the hunger periods the S was retained with more tenacity than N, which indicates the relatively great importance of the cystine radicle for the body. The proportion of urinary N in the form of NH_3 is increased in hunger. Creatine appears in the urin on the 3rd day of hunger. Feeding proteins or carbohydrates causes creatine to disappear, but fats are without effect. The creatinine excretion

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is unaffected by either proteins or carbohydrates. When protein feeding is begun the sulfate S increases more markedly than the neutral S. The proportion of ethereal sulfate increases at first, then falls. Carbohydrate feeding decreases the proportion of urea N and increases that of the NH_3. It also increases both the abs. and relative amt. of undetd. N, as compared with fasting conditions. When the diet consists solely of fat the metabolism appears to be the same as in hunger.

D. D. Van Slyke.

Purine Metabolism in Liver Diseases. S. La Franca. Inst. f. Path., Naples. *Biochem. Z.*, 35, 434–44.—Patients with the atrophic cirrhosis of Laennec showed an abnormally low ability to burn purines. Caffeine added to the diet was excreted largely as purine N in the urin. On the other hand, patients with the hypertrophic cirrhosis of Hanot showed a normal ability to destroy purines. D. D. Van Slyke.

The Action of Phenylcinchonic Acid on the Purine Metabolism of the Dog. K. Fromherz. Staedt. Krankenhaus, Wiesbaden. *Biochem. Z.*, 35, 494–505.—Phenylcinchonic acid (atophane), which increases the uric acid excretion in man, does not have this effect in the dog. In some of the expts. with dogs an increased allantoin excretion followed atophane administration. In other expts. the allantoin excretion was not increased. The positive results are explained by the hypothesis that purine metabolism is increased by atophane in both dog and man, but the increased uric acid, which is excreted as uch in man, is further oxidized by the dog into allantoin.

D. D. Van Slyke.

The Absorption of Albumin without Digestion. Eleanor V. N. Van Alstyne and P. A. Grant. Dept. Exp. Therap., Cornell Med. School, N. Y. *J. Med. Res.*, 25, 399–408.—Both the urin and serum from dogs previously injected intravenously with diluted white of egg soln. were successfully used in sensitizing guinea pigs against egg. albumin. The foreign protein could be detected in the serum 3 days after the injection. In the same way egg albumin could be detected in the serum and urin after introducing egg white into the intestins through Thiry-Vella fistula at 3 different parts of the intestinal tract. The presence of egg albumin in the urin of a case of alimentary albuminuria after a meal consisting of 6 raw eggs was demonstrated in the same way. The urin in this case also contained serum proteins. F. C. Koch.

The Influence of Organic Foods and of Iron Feeding upon the Iron Metabolism. Martin Kochmann. Pharm. Inst., Univ. Greifswald. *Biochem. Z.*, 36, 268–74.—Increase of the protein and carbohydrate food of dogs appears to affect unfavorably the Fe metabolism. Feratin, metaferrin (com. organic Fe preps.), and $Fe_3(PO_4)_2$ affect the Fe balance favorably in about equal degrees. Only the organic Fe preps., however, increase the retention of protein. D. D. Van Slyke.

Metabolism in Nitrogen Hunger. G. Kinberg. Stockholm. *Skand. Arch. Physiol.*, 25, 291–314.—The protein exchange of man in N hunger after a previous higher protein and the N elimination in N hunger at different hrs. of the day were studied. The increased N exchange before the N hunger period caused an increased N elimination for the first few days and delayed the minimum N elimination. The N elimination reached its minimum, 5.15 g. on the 9th day in a 14-day expt. Total N of the urin diminished during hunger, but the decrease did not run parallel for all the N-containing substances, being greatest in the case of urea, least for creatinine, and uric acid remaining practically constant. The NH_3 decreased until the 14th day, when there was a rise due to the increased water consumption on that day. The relation between the N, H_2SO_4 and P_2O_5 excretion remained nearly constant during the entire period. During a N hunger period of 6 days the elimination of N in 2 1/2 periods was studied on the 5th and 6th days. The periods in which food was taken on the 5th day showed a rise in N elimination. On the 6th day the elimination remained

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fairly constant from 7.30 A.M. to 3 P.M., although a meal was taken in that time, followed by a drop with a rise at 8 P.M. (supper), followed by a drop at 10.30 P.M.

H. B. LEWIS.

F. PHYSIOLOGY.

ANDREW HUNTER.

Viscosity of the Blood. W. N. WELSH. Edinburgh. *Heart*, 3, 112–31.—On the whole, viscosity is higher in males than in females. It varies little in health, but in diff. individuals it ranges from 4.74 to 6.02. The most important factors in the causation of variations are: (1) number of blood corpuscles, (2) hemoglobin content; CO_2 affects it apart from an alteration in the number of corpuscles. Venous blood is of higher viscosity than arterial. The plasma is of slightly higher viscosity than the serum. Hirudin in the dry form does not affect the viscosity. There is no relationship between viscosity, coagulability of blood and blood pressure. An immediate and marked lowering of viscosity follows venesection and this effect is more or less permanent. In pathogenic conditions there are enormous variations in viscosity, but there are usually corresponding changes in the corpuscles and hemoglobin.

P. J. HANZLIK.

The Action of the Pancreatic Juice on Proteins and Proteoses. E. ZUNZ. Inst. Therap. Univ., Bruxelles. *Arch. intern. physiol.*, 11, 191–4.—In dogs pancreatic juice collected after the injection of secretin was found to contain an ereptase resembling intestinal erepsin in its properties, as well as trypsinogen, confirming the work of Schaeffer and Terroine (*J. physiol. path. gen.*, 12, 884–90, 905–18). H. B. LEWIS.

The Origin and Significance of Thiocyanate in Saliva. WM. J. GIES. *J. Allied (Dental) Socs.*, 6, 334–8.—A summary of current views on the source and significance of thiocyanate in saliva. ALFRED P. LOTHROP.

Dipeptide and Tripeptide-cleaving Enzymes in the Saliva. A. H. KOELKER. Johns Hopkins Univ., Baltimore. *Z. physiol. Chem.*, 76, 26–36.—*l*-Leucyl-glycyl-*d*-alanine is hydrolyzed quantitatively by a salivary enzyme into *l*-leucine and glycyl-*d*-alanine. The hydrolysis of this tripeptide proceeds at a greater rate than the cleavage of *dl*-alanylglycine. The glycyl-*d*-alanine which is formed by the hydrolysis of the tripeptide is further broken down into glycine and *d*-alanine. The action of this salivary enzyme seems to be identical with that of erepsin, so far as this tripeptide is concerned. *d*-Alanyl-*d*-alanine, *dl*-alanylglycine, *dl*-leucylglycin, and glycyl-*l*-tyrosine are all hydrolyzed by saliva. *dl*-Glycylalanine is not split up under identical conditions. The faintly acid or alk. character of the saliva has no influence on the qual. hydrolysis of *dl*-alanylglycine. G. M. MEYER.

Isolation of Choleic Acid, Stearic Acid and Cholesterol from Ox Gallstones. HANS FISCHER AND P. MEYER. Munich. *Z. physiol. Chem.*, 76, 95–8.—In the process of the prep. of bilirubin from gallstones a large quantity of crystals sepd. out of the ether extract. These were recrystallized out of alc. and identified as choleic acid. Contrary to Hammarsten, this acid and lithocholic acid are tasteless. Cholalic acid is, however, intensely bitter; desoxycholic acid is only slightly so. Cholesterol and stearic acid were obtained from the mother liquor of choleic acid. G. M. MEYER.

The Influence of Age on the Symptoms Following Thyro-parathyroidectomy. S. SIMPSON. Physiol. Lab., Med. Col., Cornell Univ., Ithaca. *Proc. Soc. Exp. Biol. Med.*, 9, 2–4.—In sheep the thyroid and parathyroid glands are apparently much more important organs in the young than in the adult animal, and consequently become functionally less active as age advances. V. C. MEYERS.

Chemical Composition of Lipoids According to the Manner of Preparation. ERN. GERARD. *Compt. rend. soc. biol.*, 71, 543–5.—If the reaction of the lipoids extracted

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from the liver and spleen are estd. before and after autolysis, by 0.1 *N* NaOH in presence of phenolph., after dissolving the lipoids in neutral alc., the acidity, due to formic acid, calc. for HCl, for liver is 4.08 and 5.58%, resp. and for spleen 3.30 and 5.07%. By the procedure of Funcke for liver 0.03 and 0.102 g. of formic acid were found, for spleen 0.070 and 0.144 g., resp. Hence, the acidity of the combined lipoids is increased by autolysis. I. K. PHELPS.

Viscosimetric Studies on Human Milk. K. BASCH. Prague. *Wien. klin. Wochschr.*, 24, 1592–5.—The viscosity of human milk diminished with the period of lactation till it reached a const. value. H. B. LEWIS.

Comparative Studies on the Viscosity of Milk by the Determination of its Capillary Rise. A. KREIDL AND E. LEAK. *Wien. klin. Wochschr.*, 24, 1667–9.—The heights to which milk rose in strips of filter paper dipped in various milks was made the basis of the study of relative viscosity. The viscosity of human milk varied and diminished up to the 2nd or 3rd month of lactation, the changes running parallel to the change in the casein content. The great changes in viscosity in the first days of lactation were probably related to the secretion of the colostrum. H. B. LEWIS.

G. PATHOLOGY.

H. GIDEON WELLS.

The Behavior of the Sugar in the Urin during Salvarsan Treatment. PAUL BENDIG. Stuttgart. *Deut. Med. Wochschr.*, 37, 2335–6.—Syphilitic diabetes disappears with the leutic symptoms under salvarsan treatment. Diabetes mellitus associated with syphilis is influenced favorably in light cases. Severe diabetes is a contra-indication to the use of salvarsan on account of the threatening coma. Salvarsan itself can cause a passing glucosuria. H. J. CORPER.

Modern Views About Fatty Degeneration and Migration of Fat. CARL KAISERLING. *Med. Klinik*, 7, 1896–1902.—Fat is taken up from nourishment and the various lipoids have their origin not only from this source but also from the fatty and protein cleavage products originating in the body. These are then built up into complex mols. The fat and lipoids of the cells are metabolized and used up in the cells under normal and pathological conditions. Simple decomp. is rare. The old differentiation between infiltration and degeneration is no more to be thought of in connection with fat. Infiltration predominates over fatty degeneration. A true metamorphosis has not been demonstrated. Whatever begins as infiltration may end as decomp. P. J. HANZLIK.

Inflammation. FELIX MARCHAND. Leipzig. *Med. Klinik*, 7, 1921–7.—Acute inflammation is understood to be processes of reaction by the tissues of the organism to harmful influences on the circulatory app. The causative factors are toxic infections, of the first importance, then mechanical and physico-chem. P. J. HANZLIK.

The Mechanism of Anaphylatoxin Formation and Relations between Anaphylatoxin and Toxin. E. FRIEDBERGER. Univ. Berlin. *Ber. klin. Wochschr.*, 48, 1880–2.—Tetanus toxin, when treated with absolutely steril, but unfiltered, guinea-pig serum, and digested for 24 hrs., yields an anaphylatoxin very toxic toward guinea pigs. Probably the tetanus toxin acts similarly *in vivo*. Antitoxins can render this anaphylatoxin non-poisonous, just as foreign proteins can be detoxicated by antisera. F. C. KOCH.

The Anaphylatoxin Formation from Anthrax Bacteria and the Effect of Anthrax-immune Sera on the Toxin Formation. ALBERT SCHÜTZE. Berlin. *Ber. klin. Wochschr.*, 48, 1882–4.—Toxin is formed by incubating a suspension of dried anthrax cultures with guinea-pig serum. An excess of immune serum is not necessary to detoxicate this toxin. Anaphylatoxin is also formed when large amts. of anthrax antigen are treated with very large amts. of immune serum. F. C. KOCH.

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The Effect of Cholesterol on the Application of Organ Extracts in the Wassermann Syphilis Reaction. H. SACHS. Frankfurt a/M. *Ber. klin. Wochschr.*, 48, 2066–7. —Addition of 0.4 cc. of a 1% cholesterol soln. to 5 cc. of an alc. ext. of fresh beef heart (1 g. tissue to 5 cc. alc.) yields exts. equal to or better than the alc. extracts of syphilitic livers. F. C. KOCH.

Immunity Reactions with Lipoid-free Serum. ULRICH FRIEDMANN AND ERNST HERZFELD. Medizinisch-poliklinischen Inst., Univ. Berlin. *Ber. klin. Wochschr.*, 48, 2106–7.—Serum was dried on filter paper strips in a current of dry air, then extracted with alc., $CHCl_3$ and ether. The dry serum remaining was considered lipoid-free and when dissolved acted only slightly less as complement than the original serum. In some cases no loss in activity was noticed. Heating the lipoid-free serum to 56° for 30 mins. destroys the complement action. F. C. KOCH.

Researches on a Case of Bence-Jones Albuminuria. RUDOLF MASSINI. Med. Klin. in Basel. *Deut. Arch. klin. Med.*, 104, 29-43.—The quantity of Bence-Jones protein excreted is more or less directly proportional to the amt. of protein taken as food. The specific character of the protein can be shown by the complement fixation method. The temp. at which its solns. coagulate varies with the conc. of the protein itself and of salts and acids. With high enough concs. of the protein heat coagulation may ppt. it like serum albumin. F. C. KOCH.

The Adrenaline Content of the Suprarenals. ALEXANDRA INGIER AND GEORG SCHMORL. Dresden-Friedrichstadt. *Deut. Arch. klin. Med.*, 104, 123–67.—By a modification of the Comessati $HgCl_2$ method the adrenaline content of human suprarenals at different ages and in various pathological conditions was detd. In children up to 8 yrs. old the amt. of adrenaline gradually rizes from 0.4 mg. (for ages up to 1 yr.) to 3.96 mg. From the 10th to the 89th yr. the av. values are 4.11–6.41 mg. for males and 4.02–5.33 for females. As a general rule, 4.40 is the value for men and 4.71 for women. The final av. was 4.59 mg. per gland. In most of the pathological cases this value varied considerably below and above the normal. The results below indicate the number of cases examined and av. mg. of adrenaline found in the gland. Diphtheria (32), 2.28; pneumonia (24), 5.4; acute nephritis (31), 6.03; chronic nephritis (26), 5.31; arteriosclerosis (16), 5.37; hydronephrosis (9), 5.31; diabetes (15), 2.42; pernicious anemia (3), 3.27; Addison's disease (2), 0; eclampsia (8), 2.62; acromegaly (1), 1.25; Basedow's disease (2), 4.27. Numerous other figures are given for other diseases. F. C. KOCH.

The Ether-soluble Phosphorus Content of Blood Serum in Various Diseases. K. KIMURA AND W. STEPP. Med. Klin., Giessen. *Deut. Arch. klin. Med.*, 104, 209–15.—Blood serum, free from erythrocytes and hemoglobin, was pptd. with abs. alc., filtered, washed with alc., and dried. The residue left on evapg. the alc. filtrate was extracted with ether and the latter added to the ether extract of the pptd. proteins. The ether solns. after evapg. were extracted with ether and the phosphorus in the last residue detd. by the Neumann method. P was calc. to lecithin. The following high values were found, the figures representing g. lecithin per 1000 cc. serum: Pneumonia 2.10, typhoid convalescent 2.0, optic neuritis 2.15, diabetes mellitus 2.36–2.60, lues spinal 2.27, taboparalysis 1.97. Low values were found as follows: Basedow's disease 0.9, chronic nephritis 0.60–1.1, cardiac insufficiency with chronic nephritis 0.5. F. C. KOCH.

The Relation of the Residual Nitrogen in Blood to Nephritis and Uremia. H. HOHLWEG. Med. Klin., Giessen. *Deut. Arch. klin. Med.*, 104, 216–44.—The total residual N (x) in 10 normal human sera varied from 0.041 to 0.060 g. per 100 cc. Of this, 11.7% is pptd. by tannin, 60.8% is urea and 27.4% is not estd. separately. In nephritis x may rize to 0.120 g. or more. In both parenchymatous and interstitial

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nephritis the proportion of N pptd. by tannin is increased and in the latter form the % of the urea; N is decreased to 54.43% of the total residual N. In uremia x is as high as 0.340 g. per 100 cc. serum of this, 6.7% is pptd. by tannin and 78% is urea. Poisoning by $HgCl_2$ may cause an increase in x. In no other pathological condition was x found higher than normal, even shortly before death. F. C. KOCH.

Studies on Diabetes Insipidus and the Origin of Sodium Chloride Fever. B. STUBER. Freiburg i. Br. *Deut. Arch. klin. Med.*, 104, 394–01.—By the Trendelenburg frog transfusion method the conc. of adrenaline in the blood of a severe case of diabetes insipidus was shown to be 2–7 times that in normal human blood. S. considers hyperfunctioning of the chromaffin system an etiological factor in polyuria. Injection of 1 cc. physiological NaCl soln. or feeding 6–30 g. to the patient caused fever, increased polyuria and increased the conc. of the urin. Ingestion of NaCl-free food decreased the fever and polyuria. In view of the parallelism between NaCl administration, polyuria and adrenaline content in the blood, the probable increased formation of adrenaline and a consequent increased stimulation of the sympathetic system accounts for the rise in temp. F. C. KOCH.

Fatty Compounds as a Factor in the Etiology of Appendicitis. BERTHA VAN HOUTEN ANTHONY. New York. *J. Med. Res.*, 25, 359–72.—The histological exam. of 48 appendices indicates that Ca soaps and fatty acids predominate in the mucous membrane and submucosa of the affected appendices, while in the normal condition neutral fats and only slight amts. of fatty acids occur. F. C. KOCH.

Studies on Calcification and Ossification. IV. H. GIDEON WELLS, HARRIET F. HOLMES AND GLADYS R. HENRY. Path. Lab., Univ. Chicago. *J. Med. Res.*, 25, 373–92.—Dried rabbit and dog bloods contain as averages 0.11 and 0.057% CaO, resp. Rabbit and human urins contain 0.0022–0.042 and 0.0001–0.0002 g. CaO per cc., resp. The quant. estn. of Ca as oxalate and the histological identification independently gave closely agreeing results in examg. calcified kidneys of rabbits. Ligation of the left renal artery brought about intense calcification in the left kidney. Occlusion of the ureter at the same time usually reduced the calcification. Occlusion of the ureter without ligation of the renal artery also caused less intense calcification. Poisoning by $HgCl_2$ caused calcification in the kidneys, but of varying degrees. In all these cases it is limited to the renal epithelium and tube casts and the Ca is present as phosphate. Calcification caused by ligation of a renal artery for a period of 7 weeks shows the presence of carbonate in the deposits in the stroma, but there is no carbonate present when calcification is caused by poison, temporary ligation, etc., and limited to the renal epithelium. It is concluded that in the latter case the calcification comes from the urin, and the process is not analogous to calcification in other organs. Amts. of CaO above 2 mg. in a rabbit kidney can be detected microscopically; 10–20 mg. CaO constitutes an extensive calcification, but by complete occlusion of renal artery 25% of dry wt. of kidney may be $Ca_3(PO_4)_2$.
F. C. KOCH.

Researches in Epilepsy. D. M. ALEXANDER. Liverpool. *Lancet*, 181, 1072–5.—Neither epileptic fits nor permanent edema could be brought about in the rabbit by injecting 0.5–2.0 cc. of the following into the arachnoid space: Pig serum, the same satd. with NaCl, epileptic cerebrospinal fluid, indole in peptone solns. or sterilized ext. of epileptic feces. The sera of 30 epileptics gave negative results as to opsonic index against *B. coli communis*. Agglutination tests on *B. coli communis* also were negative in serum dilns. higher than 1:20. The urea-ammonia ratio, *viz.*, quantity of urea passed in 24 hrs. divided by the quantity of NH_3 passed in 24 hrs., varied considerably in epileptics' urins. Most attacks occur when the ratio is low, though frequently when high. A parallelism between high ethereal sulfate content of urin and

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high content of *B. aerogenes capsulatus* in feces could not be found. A quant. study of the bacterial content of epileptic feces showed nothing strikingly or definitly abnormal. F. C. KOCH.

Experimental Studies on the Function of the Kidneys. II. A. KATZ AND R. LICHTENSTEIN. Physiol. Inst., Univ. Vienna. *Wien. klin. Wochschr.*, 24, 811–3.—The presence of the toxins resulting from the ligation of the ureters of dogs and rabbits was easily detected by the precipitin reaction, using as antiserum the blood of animals injected with the serum of the operative animals. These toxins are to be regarded as proteins or complex mol. decomp. products of the proteins. H. B. LEWIS.

Alimentary Glucosuria and Adrenaline Glucosuria, with Especial Reference to the Glucosuria of Pregnancy and Diabetes. M. REICHENSTEIN. Med. Klin. Univ., Lemberg. *Wien klin. Wochschr.*, 24, 862–9.—In pregnancy, diabetes and many severe functional neuroses, adrenaline caused glucosuria only in those individuals in whom the feeding of dextrose caused alimentary glucosuria. The sugar appeared even if no corresponding material (starch, sugar, etc.) were fed. Adrenaline caused a stronger glucosuria in nervous diseases than in the other diseases studied. Adrenaline injected after feeding levulose had less effect on the elimination of the levulose than on the elimination of dextrose after feeding, where it frequently caused marked increase in the urin. H. B. L.

The Chemical Nature of Tuberculin. T. PFEIFFER, H. TRUNK AND J. LEYACKER. Heilstatte Hörgas, Steiermark. *Wien klin. Wochschr.*, 24, 1115–6.—Pure pepsin did not act on tuberculin in neutral soln. The action of com. pepsin on tuberculin in neutral soln. resulted from the action of a protease present in the pepsin prep. H. B. L.

Hematoporphyrinuria in Lead Poisoning. A. GÖTZL. Chem. Abt. sero-therap., Inst., Vienna. *Wien klin. Wochschr.*, 24, 1727–8.—Chronic Pb poisoning produced in rabbits by Pb triethylacetate caused a marked hematoporphyrinuria. Endogenous sensitization of rabbits was successful if hematoporphyrin was produced in sufficient amts. along the paths of the Pb poisoning. H. B. L.

The Oral Microörganisms: A Bacterio-chemical Study of Dental Caries. ALFRED P. LOTHROP. Lab. Biol. Chem., Columbia Univ. *J. Allied (Dental) Socs.*, 6, 297–322.—Bacteria from immune as well as badly decaying teeth produce acid and a flocculant ppt. of mucin in glucose-mucin solns. Ca is dissolved from natural extracted teeth by the products of bacterial growth in sugar bouillon inoculated with bacteria from "immune mouths" as well as from mouths showing active decay. Bacteria from a case of perfect immunity extracted as much Ca as any culture from decay cases. Common fruit juices and fruit acids dissolve relatively large amts. of Ca from extracted teeth immersed for comparatively long periods in such liquids. A review of oral microörganisms and their chem. peculiarities is included. A. P. L.

Variations in the Occurrence of Nitrite in Saliva. CLAYTON S. SMITH AND ELMER W. BAKER. Lab. Biol. Chem., Columbia Univ. *J. Allied (Dental) Socs.*, 6, 323–33.—Nitrite may be diminished in quantity or wholly removed from saliva by oral microörganisms. This may be due to enzymes eliminated by these organisms or may be attributable to intracellular influences exerted by them. Neither the occurrence nor proportion of nitrite in saliva is an index of the existence or degree of dental disease or of the rate of its progress. ALFRED P. LOTHROP.

Hemolytic Organ Extracts. P. SCHAEFER. Path. Inst., Univ. Berlin. *Biochem. Z.*, 35, 445–70.—The active hemolytic principle in organ exts. or suspensions is believed to be either soap or substances of similar nature. Soaps, like the organ hemolysins, are carried down by coagulated proteins, and the hemolytic action is the same in both

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cases. Addition of soaps to organ suspensions does not alter the mechanism of the hemolysis which results when the suspensions are mixed with blood. The soaps are given off to the blood in the same manner as the natural hemolysins. Toxolecithides behave in the same manner as soaps. In the pancreas removed from a fasting dog hemolysin may be absent, but it forms when the organ is kept at room temp. In many cases hemolysins arize as the result of autolysis, but S. believes that these secondary hemolysins may possess a different nature from that of the primary hemolysins of the organs. The formation of hemolysins in the pancreas bears no detectable relation to the stage of digestion or the time elapsed after feeding. When soaps are injected into the blood stream they disappear quickly from the blood, nor can they be detected in the pancreas. D. D. V. S.

Investigations on Tetanus Antisera Prepared by Different Methods. W. SCHÜRMANN AND E. SONNTAG. Enfektionskr. Inst., Bern. *Z. Immunität.*, 12, 1–15.—Sera prepared by subcutaneous injection of horses with tetanus toxin, spores or bacilli exhibit no agglutination specific for tetanus bacilli, and no precipitins. Intravenous injection of rabbits will not cause sufficient agglutinin to form to permit of identification of tetanus bacilli, but precipitins can be demonstrated in the serum. The manner and material of immunizing horses has no evident influence on the value of the serum obtained. H. G. W.

Antitrypsin of Serum against Pancreas, Yeast and Pyocyaneus Trypsin. H. KÄMMERER AND J. L. MOGULESKO. Med. Klin., Univ. Munich. *Z. Immunität.*, 12, 16–28.—Antitrypsin acting on yeast and pancreas trypsin is found chiefly in the albumin fraction in contrast to the antibodies for the bacterial enzymes yet studied, the latter being chiefly in the globulin fraction. Increased antitryptic activity of serum against pancreas trypsin is often accompanied by increased activity against the corresponding enzyme of yeast. H. G. W.

The Influence of Artificial Fever upon the Normal Amboceptors and Complement of Rabbits. E. FRIEDBERGER AND E. BETTAC. Pharm. Inst., Univ. Berlin. *Z. Immunität.*, 12, 29–64.—An extensive review of the effect of fever upon the course of infections, followed by report of expts. in which fever was produced in rabbits by the Sachs-Aronsohn "fever-puncture" method (destruction of thermo-regulating center in corpus striatum). The complement of the serum was found to be unaffected by this fever, but the normal hemolytic amboceptor for goat blood almost always increased parallel to the temperature. H. G. W.

The Role of Complement in Anaphylaxis. O. HARTOCH AND N. SIRENSKII. Kais. Inst. Exp. Med., St. Petersburg. *Z. Immunität.*, 12, 85–90.—If the amt. of complement in the blood of guinea pigs previously sensitized with horse serum is reduced by infection with trypanosomes, such pigs react less violently to horse serum than do either normal pigs or pigs which have not suffered loss of complement through their infection. Supports view of importance of complement in anaphylaxis. H. G. W.

Immunization against Tuberculosis. A. N. BORISSYAK, N. O. SIEBER AND G. I. METALNIKOV. Chem. Lab., Inst. Exp. Med., Univ. St. Petersburg. *Z. Immunität.*, 12, 65–84.—The most effective antigen for the production of antituberculous antibodies is the wax of tubercle bacilli; also effective are fat-free bacilli and lecithin, either alone or mixed with other substances. Tuberculin does not cause development of antibodies, and if injected together with fat-free tubercle bacilli, or tubercle bacillus wax, decreases the amt. of antibody formation that results. Antibodies obtained by immunizing with tubercle fats and fat-free bacilli, act not only against these antigens but also against dead and living bacilli. Immunizing against lecithin (commercial) produces antibodies for tubercle bacilli and their fatty content, but not for the lecithin itself. Antibodies are also obtained by feeding tubercle bacilli or tubercle wax to guinea pigs. H. G. W.

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Neurin-Tuberculin. W. SCHLAUDRAFF. Path. Inst., Allg. Krankenhaus. St. Georg, Hamburg. *Z. Immunität.*, 12, 91–126.—Merck's neurine soln. (25%) dissolves large amts. of tubercle bacilli almost completely, opt. temp. being 56°. This depends on something besides the alkalinity of the neurine, for equally strong solns. of NaOH and NH_4OH are much less solvent. Solution is preceded by a swelling of the bacilli; then the protoplasm dissolves, and last the granules. Merck's neurin-tuberculin in 0.1 cc. doses, causes death of 300 g. guinea pigs from neurine poisoning, which is best prevented by atropine; it is not more toxic for tuberculous than for normal pigs. Anaphylaxis cannot be produced against neurin-tuberculin, and tuberculous animals are not sensitive to it. It can, however, be used for complement-fixation in 1/500 strength, behaving like "old tuberculin," but is only half as strong. Doubtful precipitin tests are obtained when neurin-tuberculin is used as antigen. Animals immunized with new tuberculin showed no immune bodies in their serum by the complement fixation test, although this serum was distinctly protective for guinea pigs. Digestion of typhoid bacilli at 42° for 10 min. with 25% neurine soln. did not destroy the agglutinogen.

H. G. W.

Relation of the Reaction of the Culture Medium to the Production of Hemolysis. E. E. ATKINS. London Hosp. *J. Hyg.*, 11, 193–201.—Many bacteria have an extensive range of reaction in bouillon, but the range of streptococci from the blood stream is restricted within narrow limits. In general, neutrality to phenolph. is the optimum. Most organisms have the power of overcoming the inhibitory effect of excess NaOH. This is more common than the power to overcome HCl. The hemolysin production of *Vibrio nasik* is coëxtensive with its range of growth in varying reactions. The alk. culture produced the max. hemolysin sooner, and lost it sooner than the acid culture. The optimum reaction for the duration of hemolysins was acid 5. (5 cc. N HCl per l. in excess of neutrality to phenolph.) J. H. MITCHELL.

Biotoxin. Recent Experimental Investigations. F. MARINO-ZUCO, R. ONORATO AND L. GUIGANINO. *Gazz. chim. ital.*, 41, II, 378–67; cf. *Arch. fisiol.*, 2, No. 4; *C. A.*, 4, 3088.—When the renal functions are altered or suppressed (by nephrectomy, bilateral scission of the ureters or experimental nephritis), the blood *in vivo* shows the same spectroscopic phenomena as it exhibits *in vitro* under the action of biotoxin. Chem. reactions show that, under these conditions, biotoxin accumulates in the blood. Whereas *in vitro*, the products causing the new spectrum gradually accumulate, in the organism a part of them is eliminated and the spectroscopic phenomena do not increase in intensity with the progress of the morbid condition and the approach of death. CHAS. A. ROUILLER.

The Detoxicating Function of the Liver in the Animal Organism. V. N. VORONZOV. Pharm. Inst., Univ. Yurev. *Intern. Beitr. Path. Thérap.*, 3, 180–227.—The isolated blood-free liver of rabbits, cats and dogs decreased by retention the toxicity of different poisons when perfused in Ringer-Locke soln. Curare, nicotine, aconitine, muscarine, digitalin, atropine, physostigmine, ricin, picrotoxin, strychnine, adrenaline, alcohol and $BaCl_2$ were used. About 1/2 of the alc. disappeared upon perfusion in the Ringer-Locke soln. The degree of detoxication varied with the condition of the liver. Repeated perfusion of toxic substances of low toxicity absorbed partially or completely from the liver the same kind of toxin retained by it from a previous more toxic perfusion. Ringer-Locke soln. perfused repeatedly through a normal liver did not become toxic. C. A. BRAUTLECHT.

H. PHARMACOLOGY.

ALFRED N. RICHARDS.

Influencing Tumors by means of Therapeutic Agents in the Blood Stream. Results of Chemotherapeutic Experiments on Tumor Animals. A. v. WASSERMANN,

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FRANZ KEYSSER AND MICHAEL WASSERMANN. Berlin. *Deut. med. Wochschr.*, 37, 2389–91.—In detg. the life of carcinomatous cells in normal blood serum and in the serum of carcinomatous individuals the authors used (Na_2TeO_3) and (Na_2SeO_3) which are reduced by living cells to a black or red ppt. and were found on the second day accumulated in the center of the carcinoma cells. Local injection of these salts into tumors of mice destroyed the tumor cells. Injections of these salts into the tail vein resulted negatively in action upon the tumor cells as the material was poisonous and only small doses could be given. As transport material the authors then used fluorescein dyes which go into poorly vascularized areas fairly readily, but the results were not satisfactory. Finally a prep. from eosin and selenium was made which was easily sol. in water and could be injected into 15 g. mice in 2.5 mg. doses. This colored the mouse entirely red. When this material was injected into tumor mice it caused a softening of the tumor after the third injection (daily injections) and complete resorption occurs within 10 days unless the animal dies of toxic products absorbed. Tests were made on 4 different strains of mouse carcinoma and 1 strain of mouse sarcoma with positive results in all cases. The sarcoma seemed to disappear more rapidly than the carcinomas. H. J. CORPER.

The Influence of Microörganisms upon the Action of Salvarsan. W. L. YAKIMOFF AND NINA KOHL-YAKIMOFF. Biol. Lab. d. Georg Speyerhaus in Frankfurt a/M. *Münch. med. Wochschr.*, 58, 2601–4.—The toxicity of salvarsan is increased in trypanosome infections (mice) when mixed with small quantities (0.05 cm.) of endotoxin (*B. coli*). Endotoxin injected intravenously increases the toxicity of salvarsan given subcutaneously. H. J. C.

The Guaiacol-Arsenic Therapy of Tuberculosis. LUDWIG NÜRNBERGER. Path. Inst. in Erlangen. *Münch. med. Wochschr.*, 58, 2669–71.—Guaiacol and potassium arsenite alone or together neither retard the growth of the tubercle bacillus in culture nor influence the course of tuberculosis in the rabbit or guinea pig. H. J. C.

Influence of Caffeine on the Ureopoetic System of the Liver. G. B. ZANDA. *Arch. farm. sper.*, 11, 125–35; through *J. Chem. Soc.*, 100, II, 1017.—Diuretin and caffeine increase the sugar and urea in the blood, and the urea in the liver. This increase may explain the diuretic power of these drugs. E. J. C.

The Influence of the Atmosphere in Mines on the Miners. W. HANAUER. *Oesterr. Z. Berg-Hüttenw.*, 60, 10–2. E. J. C.

Variation in the Susceptibility of the Guinea Pig to the Heart Tonic Group. C. E. VANDERKLEED. *Am. J. Pharm.*, 84, 14–23.—Expts. were begun to det. the effect of season, food, wt. and sex upon the susceptibility of pigs to digitalis intoxication. Food must always include grain, and proper ventilation is necessary. The results so far show that the minimum lethal dose for both male and female ranging from 140 to 410 g. was 0.0000525 g. per 250 g. body wt. Frogs showed much variation; the lethal dose for female frogs from Illinois was about 19% greater than for males from the same locality, while the lethal dose for female bull-frogs from Pennsylvania was 62.5% greater. H. C. FULLER.

Digitalis. JAMES MACKENZIE. Mt. Vernon Hosp., London. *Heart*, 2, 273–386.—This is a clinical pharmacological study of the action of digitalis on the heart. The differences in action depend upon the individual as well as the lesion. In cases with normal rhythm a partial heart-block may be produced. Slowing of heart rate is accomplished by vagus stimulation. Digitalis tends to induce auricular fibrillation. Diuretic effects may be produced with no perceptible change in the heart.
P. J. HANZLIK.

Heart-block from Drugs of the Digitalis Group. J. D. WINDLE. Southall. *Heart*,

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3, 1–12.—Various degrees of heart-block resulted from the administration of digitalis, strophanthus and squill in rheumatic mitral disease. Apocynum had no effect in the conduction of impulses. P. J. H.

Heart Irregularities, Resulting from Low Percentages of Chloroform Vapor, and their Relationship to Ventricular Fibrillation. H. G. LEVY AND THOMAS LEWIS. Univ. Coll. Hosp., Med. School. *Heart*, 3, 99–108.—Low tensions of $CHCl_3$ vapor, administered to cats, produced high grades of irregularity of the heart, due to the production of new impulses in the ventricular musculature. Small intravenous injections of adrenaline chloride produced under high % of $CHCl_3$ vapor a condition of irritability, similar to that produced by low % of $CHCl_3$ alone. Low tensions of $CHCl_3$ given to cats with small injections of adrenaline chloride produced ventricular fibrillation which is the result of the origin of impulses at a number of sep. foci in the ventricular musculature. P. J. H.

Excretion of Iodine and Chloride after Administration of Iodine Preparations. E. HERZFELD AND P. HEIMANN. Chem. Lab., med. Univ. Klin., Zürich. *Med. Klinik*, 7, 1858–60.—After I administration, the excretion of chlorides stands in inverse relation to the excretion of I. With few exceptions, the quantity of Cl excreted in urin is smaller if the excretion of I increases. P. J. H.

Action of Nucleic Acid, with Special Reference to the Blood and Bone Marrow. J. MEISEN. Köln-Nippes. *Med. Klinik*, 7, 1946.—Nucleic acid produces leucocytosis. Continuous injections are accompanied by variations in number of red blood corpuscles as well as the hemoglobin content; and the bones seem to grow firmer. P. J. H.

Pharmacology in Rhinology, Laryngology and Otology. H. HAENLEIN. *Med. Klinik*, 7, 1988–90.—A review. P. J. H.

The Rationale of Acquired Tolerance to Drugs. W. E. DIXON. London. *Proc. Roy. Soc. Med.*, 5, 1–9.—A discussion of the phenomena of detoxication and tolerance exhibited by the animal organism toward substances like salicylic acid, phenol, chloral alc., alkaloids (atropine, morphine and nicotine), As, $CuSO_4$, $ZnSO_4$. Two main factors are concerned in tolerance to nicotine: (1) Nicotine is picked out from the circulation by the liver; (2) the liver brings about its destruction. P. J. H.

Laburnum Poisoning and Cytisine. P. P. LAIDLAW. London. *Proc. Roy. Soc. Med.*, 5, 10–8.—The picture of poisoning by laburnum cannot be differentiated from that of nicotine. P. J. H.

The Biological Action of Mesothorium. II. Action of Rays and Digestive Ferments. D. MINAMI. Univ. Berlin. *Ber. klin. Wochschr.*, 48, 1798–800.—Two hrs. exposure of salivary or pancreatic diastase to β- and γ-rays had no apparent effect, after 24 hrs. slight inhibition. Pepsin and trypsin were at times slightly aided. **III. Emanation Action.** A. BICKEL. *Ibid.*, 2107–8. **IV. Experimental Researches on the Resorption of Thorium X and Thorium Emanations from the Digestive Tract, their Passage into the Blood and their Excretion through the Kidneys.** OTTO EMSMANN. *Ibid.*, 2108–11.—Th is absorbed and eliminated in the urin. The blood contains Th Ems. which are rapidly removed through the lungs. Th Ems. act on enzymes similarly to Ra Ems. They are more active than β- and γ-rays from mesothorium. F. C. KOCH.

The Regulation of Blood Pressure and Carbohydrate Metabolism through the Chromaffin System. W. FALTA AND J. G. PRIESTLEY. Vienna. *Ber. klin. Wochschr.*, 48, 2102–7.—The results obtained on dogs do not agree throughout with those reported by Carnot and Josserand and by Elliott. Injection of adrenaline into the femoral artery caused no rise in blood pressure. A rise was always obtained however when adrenaline was injected peripherally into the carotid. It is concluded that whereas

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the brain vessels do not take up any adrenaline the branchings of the femoral artery take up considerable amts. of it. Venous blood, leaving organs rich in sympathetic nerve endings, contains less adrenaline than the arterial blood flowing toward these organs. Puncture diabetes is due to a disturbance of the nervous-chromaffin system, the adrenals being stimulated and the increased adrenaline secretion causing glucosuria. The chromaffin system controls the distribution of blood between organs not supplied with and those supplied with sympathetic endings; it thus maintains a const. blood pressure. F. C. K.

Some Characteristic Reactions of Atophane Urins. W. Skorczewski. I. Sohn. Med. Klin., Lemberg. *Wien. klin. Wochschr.*, 24, 1700.—A few drops of urin after the use of atophane colored conc. HCl siskin yellow. While normal urin gave a rose-gray ppt. with phosphotungstic acid, atophane urin gave a yellow ppt. Normal urin gave no color on the addition of $(NH_4)_2SO_4$ soln. and NH_4OH, while with atophane urins the liquid was colored dark green. Atophane urins gave Ehrlich's diazo reaction. After acidifying the urin with HCl and shaking out with Et_2O, EtOAc and amyl alc., a yellow ext. was obtained which gave the above reactions. Freshly prepared alcoholic, ammoniacal, glacial AcOH, or acetone solns. of atophane did not give the reactions. After reduction of atophane *in vitro* by $KMnO_4$, the reduced product gave the HCl and phosphotungstic acid reactions, but not the other reactions of atophane urin. H. B. Lewis.

Creatine. Torston Thunberg. Univ. Lund. *Zentr. Physiol.*, 25, 915–6.—Creatine must be classed among those substances which increase the gaseous exchange of extirpated living frog muscle. Expts. of 94 hrs. duration were carried out with a microrespirometer. If the control is taken as 100, then the presence of creatine at a conc. of a millimol. per l. increases the O value to 116.5 and CO_2 to 113.3. Intermediate concs. of creatine give correspondingly lower values. Creatine seems to behave in many respects like pnein of Battelli and Stern (cf. *C. A.* 5, 3074). G. M. Meyer.

Action of Methyl Alcohol in the Organism. A. Forster. *Biedermann's Zentr.*, 40, 431 (1911); *Z. Spiritusind.*, 33, 2; *J. Chem. Soc.*, 100, II, 753.—The stronger physiological action of MeOH as compared with EtOH is perhaps due to impurities hitherto not detected. J. J. M.

The Influence of the Salts of Calcium and Potassium on the Degree of Hypertrophy Produced by Adrenaline Injections in Rabbits. H. A. Stewart. Dept. Path., Columbia Univ. *Proc. Soc. Exp. Biol. Med.*, 9, 7.—Expts. were conducted to det. whether the antagonism between Ca and adrenaline, as recently described by Meltzer and Auer, Shrank and others, holds good also as regards the hypertrophy of the heart which adrenaline produces when injected intravenously into rabbits. Ca did not inhibit or prevent the hypertrophy of the heart produced by adrenaline. On a diet poor in Ca the degree of hypertrophy of the heart was insignificant. The addition of K to adrenaline increased slightly the degree of hypertrophy. V. C. Myers.

Experimental Nephritis in Guinea Pigs by Subcutaneous Injections of Chromates. W. Ophüls. Path. Lab., Cooper Med. Col. and Stanford Univ. *Proc. Soc. Exp. Biol. Med.*, 9, 11–3.—It was found impossible to produce severe lasting renal lesions in guinea pigs with chromates, probably because in these animals the chromates are too toxic in a general way and too slightly effective on the kidney locally. V. C. M.

Experimental Nephritis in Rabbits by Subcutaneous Injections of Chromates. W. Ophüls. *Proc. Soc. Exp. Biol. Med.*, 9, 13.—The acute renal lesions produced in rabbits by large sublethal doses of chromates are much more marked than those found in guinea pigs (cf. preceding abstr.) under similar conditions. There is marked albuminuria, much degeneration, necrosis and desquamation of the epithelium and abundant formation of casts of different kinds. V. C. M.

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Active Atomic Groups from the Pharmacodynamic Point of View. TIFFENEAU. *Rev. gén. chim.*, 14, 85–96.—*Groups which modify the arterial pressure* (*a*): NOOR reduces, NH_2 increases *a*. All nitrites, both organic and inorganic, the nitric ethers of the polyat. alcs. cause an abatement of *a*, at the same time slightly increasing the rate of the heart. The amino group NH_2R, combined with an open C chain, possesses a vasoconstrictor property, 1 or 2 phenol OH groups strengthening this effect. The additional introduction of an alc. OH group produces the greatest effect, as may be observed in adrenaline. *Analgesic and antipyretic groups:* If an NH_2 group is directly combined with a ring or is itself a constituent of a ring, an effect on the central nervous system is produced. *Groups which affect the central and peripheral nervous systems:* To the halogen ats. in certain anesthetics, may be attributed the depressing effect. The introduction of an even no., arranged sym., produces only a slight effect; an uneven no., arranged unsym., has a strong effect. Most of the simple ethers are in this class. *Hypnotic groups:* In the sulfonates, veronals, acetals and tertiary alcs., the hypnotic effect is to be attributed to a central C at., which must be connected with 1 or 2 different C chains, or 1 or 2 O or S-containing groups, arranged unsym. *Local anesthetic groups:* All compds., which are either amino alc. esters of BzOH or aromatic alc. esters of amino BzOH, are local anesthetics. Most amino alc. esters of alc. acids have mydriatic properties. An important eccoprotic group is the oxymethylanthraquinone, which is contained in many natural purgatives. The most favorable position for the phenol OH groups is 1 : 3. *Antiseptic groups:* To this class belongs the radical CN, which has a toxic action in some compds. An important antiseptic group is the phenolic. Organic As complexes act similarly. In his dioxydiaminoarsenobenzene, Ehrlich combined such a one, *viz.*, atoxyl, with a phenolic OH group, thus producing a very active compd. WALTER REGNAULT.

Aminoalkylglyoxalines. F. L. PYMAN. London Chem. Soc. Address. *Pharm. J.*, 87, 720.—Barger and Dale showed that the physiological activity of the aliphatic amines reached a max. at hexylamine. In the phenyl series the most active was phenylethylamine. Since *p*-hydroxyphenylethylamine is readily obtained from tyrosine by loss of CO_2, P. was led to study aminoethylglyoxaline, which is obtained in a similar manner from histidine. This substance has now been compared as to physiological activity with amino derivs. of glyoxaline having other side chains, and with the CH_3 derivs. of aminoethylglyoxaline. Of all the compds. examd., aminoethylglyoxaline is by far the most active. S. WALDBOTT.

Toxicology of Amanita phalloides (Knollenblätterschwamm). RABE. *Z. exp. Path. Thérap.*, 1911; *Pharm. Ztg.*, 1911; through *Schweiz. Wochschr.*, 49, 730.—A H_2O ext. of dried *A. phalloides* dissolves animal blood corpuscles, forming in part, methemoglobin. Small doses injected into warm-blooded animals, or ingested, cause death, but immunization is possible by gradually increasing from very small doses. Cold-blooded animals are not affected. The hemolytic toxin is pptd. almost quantitatively by EtOH and $Pb(OAc_2)$. Heating to 65° destroys its hemolytic effect. The toxin shows some albumin reactions. An alkaloid fatal to warm- and cold-blooded animals is also present. On the heart of the frog it has the same effect as muscarine. S. W.

The Influence of Lecithin on Absorption through the Skin. S. BORSHIM. Imp. Inst. f. Exp. Med., St. Petersburg. *Biochem. Z.*, 35, 471–7.—The hair was removed, by means of CaS, from a portion of the skin area of the rabbits experimented upon. The areas thus bared were covered with solns. of KI, glucose, salicylic acid, or tetanus toxin, and these substances were later sought in the urin. Parallel expts. were made in which lecithin was rubbed into the skin before the solns. to be investigated were spread over the surface. None of the substances except the KI was detected in the

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urin. Slight amts. of lecithin appear to make the skin more permeable to KI, while greater amts. have the opposit effect. D. D. VAN SLYKE.

Does the Presence of the Bile Favorably Influence the Absorption of Iron? A. KORSUNSKY. Physiol. Inst., Zurich. *Arch. Physiol.*, 1910, *Supplementband*, 363–76. —A study of the absorption of $FeCl_3$ in rabbits with and without biliary fistulas showed that the bile probably facilitated absorption of Fe, although the small number of expts. performed would permit no general conclusions. H. B. LEWIS.

The Function of the Choroid Glands and its Relation to the Toxicity of Cerebrospinal Fluid. S. P. KRAMER. *Brain*, 34, 39–44 (1911); through *J. Chem. Soc.*, 100, II, 1006.—A normal saline ext. of the choroid gland (choroid plexuses) injected into an anesthetized animal intravenously causes a temporary fall of arterial pressure; no effect on the heartbeat is noticeable. A similar effect obtained by the intravenous injection of certain specimens of cerebrospinal fluid from pathological cases is attributed to excess of the choroid secretion. E. J. C.

Glucoheptonic Acid Lactone. FRITZ ROSENFELD. *Deut. med. Wochschr.*, 37, 2189–90.—The lactone of glycoheptonic acid is a white powder of sweet taste. Fehling and Nylander tests on a 2% soln. are negative; it is levorotary and does not ferment nor form an osazone. R. used it in 3 cases of diabetes with a decrease instead of an increase in sugar output. Acetone and diacetic acid were not influenced by it. Diarrhea resulted after the administration of 10 g. twice in a day. H. J. CORPER.

Influence of Colloid Glands and Preparations from the Thyroids of Basedow's Disease and Thyreoidin on Metabolism and on the Blood Picture of Myxedema with Reference to their Iodine Content. ANTON FARIO. Chir. Klin. *Mitt. Grenz. Med. u. Chir.*, 24, 123–59.—Feeding of myxedematous patients with preps. of colloid glands and of thyroids of Basedow's disease increased the N excretion, diuresis and produced a fall in body wt. I-free preps. did not increase the N excretion. In general the N excretion went parallel with increasing I content of the preps. given. In one case, with the highest I content, the temp., pulse and respiration were increased. Neither albumin nor sugar appeared at any time in the urin. Following periods of N retention there were periods of increased N excretion and *vice versa*. Hb-content of blood in myxedema is decreased and there is also a diminished number of erythrocytes as well as a diminished % of polymorphonuclear cells. No increase in leucocytes and no eosinophilia were observed. P. J. HANZLIK.

Decomposition of Hemoglobin in the Liver. LEO HESS AND PAUL SAXL. Univ. Vienna. *Deut. Arch. klin. Med.*, 104, 1–15.—$CHCl_3$ narcosis, injection of H_3AsO_3, pilocarpine or adrenaline and P *per os*, in the white rat are followed by a rise in erythrocyte content of the blood. Fowler's soln., caffeine, opium and strophanthus, when taken by the authors, also brought about apparent erythrocytosis. Cognac and $NaNO_3$ had little or no effect. As it is well known that the drugs found active here, excepting possibly pilocarpine, opium and caffeine, have a deleterious effect on the liver and as high erythrocyte count is often associated with various pathological conditions in the liver, the authors believe the apparent erythrocytosis is due to a decreased destruction of hemoglobin in the liver. F. C. KOCH.

Elimination of Arsenic after Treatment with Organic Compounds of Arsenic. J. CHARLES BONGRAND. *Bull. sci. pharmacolog*, 18, 152–7.—B. shows that As is eliminated from the body, either at a slow rate, beginning, in the case of the sol. compds., very soon after their introduction into the system, or at a very rapid rate, beginning after a variable time subsequent to introduction, in the case of the insol. compds.

V. K. CHESNUT.

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I. ZOOLOGY.

R. A. GORTNER.

Phototactic Reactions and their Reversal in the May-fly Nymphs, Hepatagenia interpunctata, Say. J. E. WODSEDALEK. Madison. *Biol. Bull.*, 21, 265–71.—Acids were most active in reversing the phototaxis. Similar results were obtained with salts. Alkalies were less effective. 0.8% EtOH produced a reversal in a large % of the specimens. P. J. HANZLIK.

12. FOODS.

W. D. BIGELOW.

The Addition of Artificial Color to Foods. ANON. *Ann. fals.*, 4, 644.—The regulations of the Service de la Répression des Fraudes in France show a lack of uniformity in the colors permitted in different classes of food. For instance, no color may be added to wine, margarine or flour; only vegetable colors may be used with beverages, butter, fats and oils; vegetable color and cochineal may be employed with jellies and marmalades, pastry and confectionery. W. D. BIGELOW.

Notice of a Course in Food Chemistry for Food Chemists, Physicians, Lawyers Industrial and Commercial Experts. *Z. öffent. Chem.*, 17, 401. A. W. BROOMELL.

Review of the Annual Report on Technical Investigations of Foods and Feeding Stuffs in the German Empire for 1908. *Z. öffent. Chem.*, 17, 406.—The review prepared by the Imperial Board of Health deals with general trade conditions in foods, the legal status in various localities, and investigations of special foods, etc. In a supplement are tables showing the character and number of researches and analyses conducted by the various directors. A. W. BROOMELL.

Muncipalities and Food. R. JONES. *Brit. Food J.*, 13, 166.—Paper read at the Dublin Public Health Congress regarding the sanitary duties of municipal bodies. A. W. B.

The Use of Antiseptics for the Preparation or Preservation of Foods. ANON. *Ann. fals.*, 4, 646.—Conditions under which the use of H_2SO_3, sulfites, $NaHCO_3$, boric and salicylic acids is permitted in food products by the French law. P. B. DUNBAR.

Report of the Agricultural Chemist. J. C. BRÜNNICH. Dept. Agr. and Stock (Queensland), *Ann. Rpt.*, 1910–11, 43–61.—New work is covered in manuring expts., analyses of butters, and dipping fluids for cattle. Detailed tables are given of analyses of soils, fodder plants, grasses, ensilages, wheats and flours. E. L. P. TREUTHARDT.

Certain Changes in the Composition of the Nitrogenous Constituents of Meat Extracts. A. M. WRIGHT. *J. Soc. Chem. Ind.*, 30, 1197–8.—Meat ext. liquor analyzing H_2O 95.02%, organic matter 4.07%, ash 0.91%, acidity as lactic acid 0.50%, total N 0.488%, insol. and coaguable protein 0.165%, proteoses 0.838%, peptone-like substances and polypeptides 0, total meat bases 0.886% and NH_3 0.054%, was divided into 2 portions. One portion was conc. under a partial vacuum of 15 in. at 82° for 3½ hrs., when the H_2O was reduced to 18.36%. This ext. showed certain changes as compared with the original liquor. For comparison all results are calc. to a 20% H_2O basis. The % of organic matter decreased, the % of ash increased and 0.31% of peptone-like substances were formed. Otherwise there was little change. The other portion of the original liquor was evapd. by the open-pan method at 100° for 48 hrs. when the H_2O content was 17.6%. Here marked changes were found. The % of organic matter, insol. and coagulable protein, proteoses, total meat bases and NH_3 decreased. The ash and acidity increased. The peptone-like substances and polypeptides increased

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from 0 to 8.69%. These have a bitter taste and exts. containing 12% and above taste bitter, while exts. containing less than 8.7% have no such taste. The marked changes observed in exts. prepared by the open-pan method are due to the prolonged action of heat on the N material in the presence of the normal flesh acids and salts. The "burned" flavor sometimes noted in meat exts. is probably due to the same cause; no such flavor is found in exts. prepared in vacuum. F. C. COOK.

Identification of Rice and Mineral Substances in Wheat Flour. L. SURRE. *Ann. fals.*, **4**, 569.—A modification of Bellier's method has proved reliable in detecting an addition of 0.5% of rice starch or foreign mineral substance. The wash water from the gluten detn. is shaken and 5 cc. removed and centrifuged for 2 min. at 2000 revolutions per min. The water is completely decanted from the starch deposit, and 5 cc. of Bellier's reagent (H_2O 85, glycerol 15, KOH 5 pts.) added to the latter. The mixt. is stirred until translucent, requiring about 5 min. at 30–40°. 25–30 cc. H_2O are added, the whole stirred and centrifuged for 5 min. When the supernatant liquid is decanted, the rice starch grains and foreign mineral substance are found in the remaining deposit and easily recognized with a microscope. Roughly quant. estimates may be made by preparing mixts. of wheat starch with 1, 2, 3%, etc. of rice starch, and submitting them along with the sample for analysis, to the above process. A. W. BROOMELL.

Investigations of the Fat Content of Cream Cheese. K. WINDISCH, A. RAU, O. MEZGER AND H. JESSER. *Z. Nahr. Genussm.*, **22**, 489.—Buttenberg and Koenig (*C. A.*, **5**, 729) and others have classified cheeses according to the fat content as follows: Cream (überfetter) cheese, over 60% fat; whole milk cheese, 45–60%; milk cheese, 35–45%; half skimmed cheese, 25–35%; skimmed cheese, under 25% fat. To assist in gathering data to promote such a rational classification, 75 samples marked "cream cheese" (Rahmkäsen) were analyzed for moisture and fat and *n* of fat. For moist., 2–3 g. were dried to const. wt. with sand at 100–15°. The fat was detd. by the Bondzynski-Ratzlaff method using a modified Gottlieb-Röse app. The *n* of the fat was obtained by extracting the cheese ground with pumice, with Et_2O, drying with $CaCl_2$ and distilling off the Et_2O. Somewhat lower readings are obtained than by the HCl method (Bondzynski-Ratzlaff). Calc. to a dry basis, 53.3% of the samples had under 35% of fat, 22.7% between 35–45%, and 24% above 45% of fat. Not one sample was up to a usual standard for cream cheese of 55%. 92% of the samples had fat above 30%. In general, most of the cheeses were prepared from partly skimmed, and few from even whole milk. A. W. B.

The Detection of Cocoanut Fat in Butter and Lard. EDUARD POLENSKE. *Arb. Kais. Gesundh.*, **38**, 402–14.—P. applies the methods of Ewers (*C. A.*, **4**, 1690, *et al.*), of Fendler (*C. A.*, **4**, 2213), and that published by himself (*Arb. Kais. Gesundh.*, **20**, 545 (1904)) to 42 samples of butter of known origin. The first 2 methods are not to be trusted for the detection of added cocoanut fat, while the last can be depended on to give reliable results. The last-named method is also said to be trustworthy in the detection of cocoanut fat in lard. P. B. DUNBAR.

The Determination of Moisture in Butter. A. C. D. RIVETT. *Chem. News*, **104**, 261.—Moisture in butter is detd. by means of CaC_2. Results differ from those obtained by heating method by only 0.2 or 0.3. J. M. JOHNSON.

The Dirt Content of Milk. O. RAMMSTEDT. *Z. angew. Chem.*, **24**, 2140.—A review of the methods already suggested for detecting and estg. foreign material, by settling the dirt with a centrifuge or by gravity. A. W. BROOMELL.

The Chlorine Content of Milk. P. POETSCHKE. *J. Ind. Eng. Chem.*, **4**, 38; cf. *C. A.*, **4**, 1773; **5**, 2403, 3098.—P.'s method of detg. Cl of milk is given. The ratio

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of ash to NaCl is considered significant, and on 101 samples tested the av. ratio is 4.5, with 95% of the figs. included between 3 and 6. The detn. throws light on cases of watered milk, and of milk with added salt. A. W. B.

Determination of Chlorine in Milk. B. G. EGGINK. Utrecht. *Chem. Weekblad*, **8**, 904–6.—The method of the Codex Alimentarius, the method of Bonemma, the ashing method and 2 methods of Arnold were used in comparative tests. The method of Bonemma gave considerably too low results, due to the fact that the proteins pptd. by HNO_3 hold back part of the Cl; cf. preceding abstr. P. A. YODER.

Mannitol Contained in Asparagus Juice. B. TOLLENS. *J. Landw.*, **59**, 429–30.—Fresh or sterilized juice which had been standing for some time yielded no mannitol while juice not sterilized and kept for some time yielded mannitol. P. A. Y.

Fat Determinations in Feedstuffs and Seeds. M. MONHAUPT. *Chem. Ztg.*, **35**, 1305.—When fat percents are detd. by shaking 5 g. of the sample with 100 cc. of the solvent and detg. the fat in an aliquot (50 cc.) of the soln., it is proposed to introduce a correction to allow for the vol. of the fat. Disregarding contraction phenomena, the formula for the above quantities and for a fat of the av. sp. gr., 0.93, is $x = 100p/(100 - 5p/93)$, where p is the apparent and x the corrected %. P. A. Y.

Viscosimetric Studies on Milk (BASCH). **11A.** Colorimetric Test for Caramel (HALE). **17.** Approximate Estimation of Starch (REED). **7.** Analysis of Sugar Mixtures (VALLIER). **28.** Salts of Milk in Nourishment (FRIEDENTHAL). **11F.** Oils from Fruits of Palms (HÉBERT). **27.** Sanitary Condition of Shell Fish. **14.** Detection of Coconut Oil in Butter (HANUS, PETRIK). **27.**

U. S., 1,013,453, Jan. 2. W. T. SHEPARD. **Making white wheat meal.**

U. S., 1,013,568, Jan. 2. J. K. SHARPE, JR. **Preserving comminuted fodder.**

U. S., 1,013,594, and 1,013,595, Jan. 2. A. FORNANDER. **Apparatus for homogenizing milk and other liquids.**

U. S., 1,013,696, Jan. 2. G. H. STRONG. **Food for horses and cattle.**

U. S., 1,014,099, Jan. 9. G. SCHOCK. **Food product made from oats.**

U. S., 1,014,574, Jan. 9. J. DE LISLE. **Making and packaging butter.**

U. S., 1,014,609, Jan. 9. J. ROEH. **Desiccating milk.**

U. S., 1,015,262, Jan. 16. C. H. CAMPBELL. **Desiccating milk.**

U. S., 1,015,271, Jan. 16. L. W. GEISLER. **Decaffeinizing coffee.**

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14. WATER, SEWAGE AND SANITATION.

EDWARD BARTOW.

Purification of Non-potable Waters and Methods of Analysis. MIGUEL CORDERO. *Anales inst. med. nacional*, **10**, 269–71.—Discussion. H. S. PAINE.

"Water-finders." W. P. GERHARD. *Gesundh. Ing.*, 34, 877–80.—G. does not believe that there are people who can designate an underground water course. ARTHUR LEDERER.

Life of Wrought Iron and Steel Service Pipes. Discussion before the New England Water Works Association. W. H. WALKER. *Eng. News*, **66**, 753–4.—A review of the now generally accepted explanation that Fe goes into soln. naturally in water, and a discussion of the tests carried on at the Mass. Inst. of Tech. Also a discussion by F. N. Speller and Geo. Schuman. ARTHUR LEDERER.

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The Ultraviolet Rays. *Can. Eng.*, 22, 129–32.—A review of general material from the Marseilles (France) expts. on water purification. LANGDON PEARSE.

Improved Sedgwick Rafter Filter for Use in the Microscopical Examination of Water. S. T. POWELL. *Eng. News*, 66, 735.—An improvement facilitating the transfer of the conc. water sample from the funnel to the counting chamber previous to the exam. of the organisms. ARTHUR LEDERER.

Experiments with Contact Beds. H. W. CLARK AND S. DEM. GAGE. *Eng. Record*, 65, 35–6.—Studies on the purification of sewage in 3 contact filters conducted at the Lawrence expt. station. One filter constructed of coke has been operated for 10 yrs. Two slate beds have been in operation for 1½ yrs. The slate filter is far less successful in removing suspended matter than the coal strainer. ARTHUR LEDERER.

Portable Emergency Hypochlorite Water Disinfecting Plant of the Kansas State Board of Health. W. C. HOAD. *Eng. News*, 66, 779.—The plant consists essentially of 3 substantial oak barrels, an especially designed orifice box, and the necessary valves and connections. App. illustrated. ARTHUR LEDERER.

Double Municipal Water Supplies. W. T. SEDGWICK AND H. P. LETTON. N. E. W. W. Assn., Dec., 1911. *Mun. J. Eng.*, 32, 7–8; *Eng. Contr.*, 37, 75–6.—In order to make the system practicable it is necessary (1) to so regulate the use of the smaller supply that it be not wasted, (2) to so treat the larger supply that it be not used under any circumstances for drinking. High price under (1), and denaturizing by $Ca(OCl)_2$ under (2) will attain the end. LANGDON PEARSE.

Filtration Results at Reading, Pa. E. L. NUEBLING. *Eng. Record*, 64, 769.—A record of operating results, during 1910 and 1911, on slow sand filters. L. P.

Chemical and Biological Investigations on the Illinois River, Mid-summer of 1911. Advance sheet Bull. Ill. State Lab. Nat. Hist., 1911. S. A. FORBES.—The dissolved O in the river at Morris showed an av. of 9.8% of satn. There were no fish or any other animals requiring O. At Marseilles, 16 miles further down, there was only 7.5% of O satn. and no fishes. At Chillicothe a max. of 49% was reached and fish were found. The upper 26 miles was at the time of observation (low water and hot weather), a great septic tank for the city of Chicago and its suburbs. Gases from the bottom sediments were identical in comp. with gases from septic tanks. E. BARTOW.

A New Sprinkling Filter at Reading, Pa. E. S. CHASE. *Eng. Record*, 64, 770.—An engineering description of an acre bed of slag, and settling basin, with analytical results for 1½ months' operation. LANGDON PEARSE.

Diatoms at Reading, Pa. E. L. NUEBLING. *Eng. Record*, 64, 767.—Two hundred lbs. $CuSO_4$ in 101,000,000 gallons reservoir reduced diatoms (largely synedra) in 10 days from 3720 to 6 standard units per cc. LANGDON PEARSE.

The Montreal Filtration Works. F. E. FIELD. *Can. Eng.*, 22, 191–6.—Prefilters, slow sand filters, with Blaisdell washing machines, and filtered water basins are provided. LANGDON PEARSE.

The Use of the Berkefeld Filter for the Determination of Bacteria in Water. ERNST HESSE. *Z. Hyg.*, 69, 522.—By the use of the Berkefeld, bacteria can be filtered out of water. Then on washing the bacteria into a small vol. with steril water, and then plating, or dilg. and plating, a more accurate bacterial analysis of water is possible. JOHN GAUB.

Purification and Agricultural Utilization of Waste Waters. A. MÜNTZ AND E. LAINE. *Bull soc. encour.*, 116, 133–66; through *J. Soc. Chem. Ind.*, 30, 1403; cf. *C. A.*, 5, 2133, 2519.—The agr. use of sewage is discussed. Expts. were made as to the distribution of the fertilizing elements of sewage in the layers of the soil. A plot

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of land was irrigated with sewage for 7 mos. and it was found that nearly all the N passed away in the drainage water, only the N in the suspended organic matter being retained mechanically in the top 10 cm. of the soil, which it is necessary to incorporate with the adjacent layer in order to keep the soil permeable. The phosphoric acid is retained exclusively in the top layer, while the potash, lime and magnesia pass partially into the lower layers where they are absorbed to some extent, the remainder passing into the drainage water. The quantity of sewage required for irrigation purposes is shown to be 3–4 thousand cu. m. per hectare for natural uncultivated land, although even in this amt. the N would be excessive, whereas in practice often 10 times this amt. is applied. The fertilizing elements in sewage are not present in suitable proportions, and the N being in greatest excess, it is preferable to add phosphate to the land and to apply the sewage in smaller quantity. If the subject could be considered purely from the agr. point of view, instead of from the public health standpoint, a much larger area could be put under cultivation by irrigation of sewage.

JOHN GAUB.

Notes on the Theory and Practice of Percolating Filters. J. E. FARMER. Assn. Mgrs. Sewage Disposal Works (Eng.). *Can. Eng.*, 22, 111–2.—Clinker, gravel and broken pottery are used. Good drainage is essential. LANGDON PEARSE.

Imhoff Tanks and Sprinkling Filters, at Holzwickede. C. M. SAVILLE AND R. H. GOULD. *Eng. Record*, 65, 73–4.—A description of the plant. The sewage is strong, 50 gals. per cap. per day. Prelim. settling removes 70% suspended matter, or 97% sett. suspended matter. Filter is used from Apr. to Dec., at nom. rate 7 mil. gal. per acre per day, applied by a revolving sprinkler. 6.7 pts. per mil. of nitrates are found in effluent. The sludge removed from primary and secondary tanks is 10.4 cu. in. per inhabitant per day. After 6 mos., 67% moisture. After drying 7 days 100 cu. ft. per 1000 inhabitants per mo., 21% organic. Costs $375 per year to operate. L. P.

Sewage Disposal. ANON. *Sanit. Record*, 49, 2.—A short review of conclusions drawn from the operation of sewage purification plants in England during the past year. ARTHUR LEDERER.

The Relation of the Putrescibility of the Settling and Non-settling Suspended Matter in Sewage. ARTHUR LEDERER. *Eng. Record*, 64, 733–4.—The methods of detg. putrescibility are briefly reviewed, with a description of "Phelps" method of calc. and its adaptation to the expts. Dilns. of 1 part of sewage to 8 or 10 parts of water from Lake Michigan were incubated in Mg citrate bottles for 24 hrs. at 20°. The same dilns. were used for settled and filtered sewage. The reduction of the dissolved O was studied, as well as the chem. changes (2 tables). The conclusions are that on a domestic sewage from a large area the removal of suspended matter capable of settling constitutes an improvement from the diln. standpoint much less than the % of suspended matter removed. The finely divided, slowly settling, suspended matter and pseudo-colloidal matter, not capable of settling, make up the greater part of the putrescible material.

LANGDON PEARSE.

Consumer Gas from Sewage. EDIT. *Mun. J. Eng.*, 32, 56.—The chief obstacle is the amt. of moisture in the sludge, which cannot be removed economically by existing methods of drying. LANGDON PEARSE.

Sewage Bacteria and Odors. G. W. FULLER. *Eng. News*, 67, 16–8; cf. *C. A.*, 5, 2292; 6, 266.—A general discussion of the following topics: Relation of decomp. to nuisances, oxidation and reduction of sewage, minimizing of odors through aerobic decomp., proper methods for avoiding odors in sewage systems, seeding, aeration, nature of odors (both gaseous and non-gaseous compds.), and the control of H_2S odors

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by arresting sulfate reduction, by bacterial cultivation, conc. and mixing, pptn. by Fe salts, or by oxidation. LANGDON PEARSE.

Studies of Special Methods of Water Purification. H. W. CLARK AND S. D. GAGE. *Eng. Record*, 64, 758–60; *Eng. Contr.*, 37, 102–4.—A review of results on mechanical filtration combined with disinfection, double filtration combined with disinfection, clarification by upward filtration through a roughing filter of coarse material, and the purification of water by a sprinkling filter of sand. LANGDON PEARSE.

Preliminary Treatments for Sewage Clarification. H. W. CLARK AND STEPHEN DEM. GAGE. *Eng. Record*, 65, 27.—A description of expts. contained in the 1910 report of the Lawrence expt. station of the Mass. State Bd. of Health (cf. preceding abstr.) ARTHUR LEDERER.

Recent Methods of Sewage Clarification and Sludge Treatment in Germany. E. KUICHLING. *Eng. News*, 66, 768–70.—The construction of the Emscher tank has been criticized by Schönfelder who prefers the relatively shallow rectangular sedimentation tanks built at Elberfeld. Complete sedimentation cannot be secured in tanks of uniform cross-section, and with velocities of flows ranging from $^1/_6$ to ½ inch per sec. when the length of the tank is less than 130 ft. The sludge is removed from the Elberfeld tanks through pipes at frequent intervals in order to avoid the destruction of much valuable organic matter. It contains a large % of fatty matter. The vol. of the sludge is 0.4% of the vol. of the sewage. The sludge is discharged into lagoons and permeable ground. The treatment is less expensive than if the sludge is allowed to decompose in the costly Emscher tanks. ARTHUR LEDERER.

Sewage in Sea Water. E. A. LETTS. Royal Sanitary Inst. *Eng. Record*, 65, 12.—Two characteristics of sea water give it a different capacity than that of fresh water for receiving sewage. Adeney found that during calm weather deaerated sea water transmits 0.08 cc. of O to a depth of at least 6 ft. in 1 hr., while fresh water transmits only 0.03 cc. L. found that sea water does not retard the fermentation in the first or C stage, contrary to the statement of other investigators. ARTHUR LEDERER.

Present European Practice in Sewage Purification. R. L. SACKETT. *Mun. Eng.*, 42, 9–17.—The sludge problem is the most pressing. The disposal plants at Salford, Manchester, Saltley, Birmingham, Hanley, Fenton, Stoke, Hampton, Paris and Berlin are briefly described with engineering detail, notes on operation, and costs covering the various types of tanks and filters, as well as sewage farms. LANGDON PEARSE.

Results of Septic Tank Treatment of Sewage at Plainfield, N. J. R. S. LANPHEAR. *Eng. Record*, 65, 47–50; cf. *C. A.*, 5, 2681.—A domestic sewage is treated, in a combination of tanks, giving a nominal period of 9 hrs. Analyses are given showing suspended matter and O consumed in screened sewage and effluent. The sludge is run into an underdrained sludge bed. Increase in flow and gas ebullition increase the output of suspended matter. Attempts were made to prevent scum from forming. The best monthly av. removal of suspended matter was 76%, the lowest 17, yearly av. 64. LANGDON PEARSE.

Sewage Treatment at Prague. MASLO. *Mun. J. Eng.*, 32, 52–4.—The sewerage is on the combined plan. A grit chamber is followed by sedimentation tanks, in which lime is added. The sludge may be discharged into lagoons, or onto drying beds, or into sludge scows to empty onto a sandy area. Typhoid statistics are given. L. P.

Operating Results at the Columbus Sewage Works. C. B. HOOVER. *Eng. Record*, 65, 11–2.—The sewage passes first through coarse screens and settling tanks. The % removal of suspended matter is 60; the improvement with respect to stream pollution only 28%. About 4½ billion gals. of sewage passed through the tanks. 2480 tons of material was deposited. The sludge was discharged into the Scioto river at

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times of flood. The clarified sewage is oxidized on beds of limestone. No clogging occurred within the last 2 yrs. The sprinkling filter purification varied from 60 to 80%. The best results were obtained in summer. The filter effluents are settled in 2 shallow basins. The basins removed about 50% of the suspended matter.

FRANK BACHMANN.

Dibdin Slate Beds. *Eng. Record*, 65, 5.—A résumé from the 7th report of the Royal Commission on Sewage Disposal. The % reduction of suspended matter was 27.4, 47.5 and 66.6 at 3 places. If the sludge is allowed to run off, the liquid capacity may be maintained; clogging ensues if retained. At Devizes, sludge was estd. at 0.94 cu. yd. per mil. gals. Odor from the effluent is noted. L. PEARSE.

The Carbon Dioxide Contents of Various Forms of Natural and Artificial Carbonic Acid Baths, and of the Atmosphere above these Baths. R. VON DER HEIDE. *Z. Balg. Klim. Kurorthyg.*, 3, 644–58; *Chem. Zentr.*, 1911, I, 1245.—The expts. were carried on at the baths of Altheide and Ems. At the Altheide bath the largest quantity of CO_2 could be found at the bottom of the water in the bath tub, while at Ems the largest quantity was present in the surface layer. The explanation lies in the different prep. of these waters, and in the mixing of the CO_2 water with the water which is added to regulate the temp. Artificial baths gave off more CO_2 than natural baths. The bath at Ems at temps. of 28°, 25° and 20°, at the beginning and at the end, contains more CO_2 than the bath at Altheide. The increase of CO_2 at a decreasing temp. is more pronounced at the Ems than at the Altheide bath. ARTHUR LEDERER.

Seasonal Variations in the Sanitary Condition of Shell Fish. AM. PUB. HEALTH ASSOC. *Eng. Record*, 64, 775.—Comment is made on the closing of the oyster in winter, and the comparative safety from infection between Dec. 1 and Apr. 1, even when subject to contamination. LANGDON PEARSE.

Bacterial Content of Distilled Water (MÜLLER). 17.

Ger., 229,506, Apr. 18, 1909. J. FRYNTA. App. for **purifying sewage** with device for automatically draining solids.

Ger., 230,045, Dec. 19, 1909. NOOITGEDAGT and ZONEN. Automatic app. for the **purification of boiler water** by means of chemicals.

Ger., 230,869, July 30, 1908. G. WINDSIHILD. Rotating sifter for **purifying sewage.**

Ger., 231,289, Apr. 25, 1909. FR. STEINLE. Automatically operating app. for **mixing disinfecting liquids with sewage.**

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15. SOILS AND FERTILIZERS.

F. P. VEITCH.

Colorimetric Determination of Phosphoric Acid in Arable Soils. CARLOS R. HERRERA. *Anales inst. med. nacional*, 10, 271–6.—Application of the method to soil analysis. 20 g. soil, dried at 110°, are heated to low redness in a Pt crucible to destroy organic matter and digested with HNO_3 on water bath for 5 hrs. with frequent shaking. The filtered soln. is evapd. to dryness in a Pt dish, the oxides of Fe and Al dissolved in 5 cc. each of HNO_3 and H_2O, and filtered from SiO_2. The temp. should be kept below 120° in order to prevent formation of alkali and alk. earth silicates which would later form silicomolybdates. The filtrate is pptd. with $(NH_4)_2MoO_4$, the ppt. dissolved in NH_4OH and, after addition of $K_4Fe(CN)_6$, compared with a standard soln. prepared from pure Na_2HPO_4. Citrate-sol. H_3PO_4 may be detd. in a similar manner. H. S. PAINE.

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Colorimetric Determination of Iron by Potassium Thiocyanate. FRANCISCO LISCI. *Anales inst. med. nacional*, 10, 269–71.—Application of the method to soil analysis. After soln. in an appropriate solvent (HCl, HNO_3, etc.) the soln. is pptd. by NH_4OH, the ppt. washed with dist. water, dissolved in HCl and compared colorimetrically with standard solns. H. S. PAINE.

Marl for Soil Improvement from Various Formations in Hannover. ADOLF ROSENBACH. Univ. Göttingen. *J. Landw.*, 59, 407–18.—Attention is called to a divergence in the use of the term "marl" in the geological and the agricultural literature, it being applied in the latter to any rock formation that is used directly for the improvement of soils. Experience has shown that rocks very low in lime have produced marked increases in crops. The explanation is now thought to be found in the H_3PO_4 content. P. A. YODER.

Influence of Dry Seasons and Fertilizers on the Size of Starch Grains of the Potato. V. VILIKOVSKY. Tábor. *Chemické Listy*, 5, 412–4.—Extremely dry seasons diminish the size of the grains. Potash fertilizers produce the largest grains. P. J. HANZLIK.

Water and Fertilization. GERLACH. Bromberg. *Illust. landw. Ztg.*, 31, 889–91, 896–7.—It was found profitable in a dry season to apply fertilizers. In lisimeter expts. the water required to produce 1 kg. dry matter in the crop was 1196 kg. in soil not fertilized and 710 kg. in fertilized soil. To produce 100 kg. rye grain, there was required 500 cu. m. of water in soil without N application and 130 cu. m. in soil with N application. At Bromberg, with an av. annual pptn. of 500 mm. it pays as a rule to irrigate sandy soil and in dry seasons also the heavier soils. P. A. YODER.

Seaweed as Manure. ANON. Leaflet No. 254 (British) Board Agr. Fisheries. *Pharm. J.*, 87, 705.—Seaweed contains more ash and less H_3PO_4, but about twice as much K as ordinary farm crops except mangold, buckwheat and mustard. Wet weed contains these av. %: Water, 75; organic matter, 18; N, 0.5; potash, 1.2; H_3PO_4, 0.09. On drying in air, the N, K and H_3PO_4 content increases 4–6 fold. The comp. of seaweed varies with the season; that cut in Oct. is poorer than that of Mar. or May. The deep-sea *laminaria* is richer especially in K than *fucus* cut from the rocks, and is valued more highly by the kelp burners owing to its superior I content. In farm practice, seaweed more or less takes the place of dung, but decomposes more completely, being devoid of fibers. Its manurial value is high; on the basis of current unit values, while in one ton of finished manure the fertilizing materials cost about 10 s., those in one ton of dried seaweed will cost about 40–65 s. S. WALDBOTT.

The Constitution of Basic Slag. HARTLEB. *Z. öffent. Chem.*, 17, 381–9.—H. criticizes the work of Blome (*C. A.*, 5, 1488), and concluded from Blome's work that addition of sand to basic slag diminishes instead of increases the citric acid-sol. P_2O_5. Also the addition of sand and lime diminishes the citric-sol. P_2O_5 except when the 2 are in the proportion to form a normal silicate, in which case the amt. of citric acid-sol. P_2O_5 remains unchanged. PERCY H. WALKER.

Combatting the Caterpillar Plague in Rice Nursery Beds. A. G. VERHUEL. *Arch. Suikerind.*, 19, 1659–61.—Lead arsenate should be avoided because of the danger from poisoning. The portion carried off by the irrigation water in soln. or suspension may poison fish or animals drinking the water. Of the portion sinking into the ground, this crop or succeeding ones of maize, tobacco, legumes or sugar cane may take up H_3AsO_4, especially in case of a deficiency of phosphates, and cause chronic poisoning of man or stock. P. A. YODER.

New Uses of Explosives in Agriculture. F. H. GUNSOLUS. *J. Frank. Inst.*, 172, 153–61. E. J. C.

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Plant Physiology (MAZÉ). 11D. Utilization of Waste Waters (MÜNTZ, LAINE). 14. Report of the Agricultural Chemist (BRÜNNICH). 12. Estimation of Phosphoric Acid (VON LORENZ). 7.

U. S., 1,014,254, Jan. 9. N. R. PRATT. **Enriching native phosphates containing sulfates.**

U. S., 1,014,255, Jan. 9. *Idem.* **Dissolving out sulfates from mixtures with phosphates,** by use of sea water.

U. S., 1,014,742, Jan. 16. E. O. BARSTOW. **Making lead arsenate.**

16. FERMENTED AND DISTILLED LIQUORS.

ROBERT WAHL.

Determination of Volatil Acids in Wines. A. VERDA. *Schweiz. Wochschr.*, 49, 685–7.—The official Swiss Manual of Food Products limits the vol. to be collected by distillation with steam to 200 cc. from 50 cc. of wine employed. V. has found this insufficient (*C. A.*, 5, 3316). Quoting at length Windisch and Roettgen (*C. A.*, 5, 3715), V. insists that a detailed *modus operandi* should be given in the next revision of the manuals. S. WALDBOTT.

Influence of Certain Substances Used in the Cellaring of Wines on the Alkalinity of the Ash. W. J. BARAGIOLA. Chem. Dept. Expt. Station, Wädenswil. *Schweiz. Wochschr.*, 48, 505–7.—B. critically reviews the work of G. de Astis (*C. A.*, 5, 1314). Secondary conditions have a strong influence on alkalinity as shown by B. and P. Huber (*Mitt. Gebiet d. Lebensm. Unters. Hygiene, Schweiz. Gesundh. Amt.*, 1, 158 (1910)). They find that low alkalinity is always occasioned when sulfates, chlorides or phosphates are present, NH_4Cl and $(NH_4)_2HPO_4$ being often added to promote growth of yeast. On the other hand, anti-acid agents considerably increase total alkalinity. S. WALDBOTT.

Wines of the Season of 1911. G. FILAUDEAU. *Ann. fals.*, 4, 648.—The max., min. and av. figures for total alc. and acidity are given for wines from all the principal wine-producing districts of France. Data regarding soil, climate and total production are also given. P. B. DUNBAR.

Possible Employment of Aluminium Vessels in Wine Manufacture. K. BRAUGARD. *Chem. Ztg.*, 35, 1343–4.—B. concludes from expts. that fruit wine may be fermented and also stored in Al vessels without impairing quality and clear appearance. Small amts. of Al could be detected in the wine as well as in the dry residue. These may have been originally contained in the fruit or in the water used for extraction, and, therefore, form normal constituents of the ash. As far as could be seen the Al vessels showed no signs of corrosion. There seems no reason why these should not find the same extensive application in wine making as in brewing. C. A. NOWAK.

Metallic Turbidities in Beers. F. SCHÖNFELD. Berlin. *Chem. Ztg.*, 34, 1144.—Metals are not indifferent toward beer. The most to be feared is Sn; its effect varies with the kind of tin and beer. The greater the turbidity is the larger the CO_2 content and the greater the acid content. Boiling the wort with the $CaCO_3$ aids in its prevention. The alkalinity and carbonate and sulfate content affect the solubility of the metals. E. J. WITZEMANN.

Hop Oasts. Some Suggested Improvements. H. A. KITTLE. *London Brewers' J.*, 47, 710–12.—K. proposes and describes a method which is a compromize between drying air and heating it, the air being dried as much as is economical and heated to a temp. of not more than 90–100° F. Apart from meeting the conditions enumerated

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by K. the chief advantages of the system are: 1. The oast itself is made use of without extensive structural alterations. 2. These alterations are of a simple and cheap kind. 3. No expensive or elaborate machinery is installed. 4. High temps. and the need for skilled driers are eliminated. 5. The cheapest fuel can be used and the quantity considerably lessened. 6. The time of drying is much less, and in consequence the color, odor and toughness of the hops less likely to be spoiled. C. A. NOWAK.

The Mechanism of Alcoholic Fermentation. A. FERNBACH. *London Brewers' J.*, 47, 712–4.—F. correlates the most recent investigations on this subject and expounds the new ideas they suggest in connection with the mechanism of alcoholic fermentation. C. A. NOWAK.

Special Effect of Temperature on the Saccharifying Diastase of Malt. H. VAN LAER. *London Brewers' J.*, 47, 705–6.—(1) The saccharifications effected by a malt ext. that has been sufficiently weakened by the action of heat are characterized by a diminishing coeff. of velocity. (2) The modification is continuous; if the vol. of the fresh malt ext. employed initiates reactions in which the value of K is an increasing quantity, the same vol. of malt ext. in the enfeebled condition sets up, in the first place, logarithmic transformation. Beyond this the use of a higher enfeebling temp. or the prolongation of exposure to the same temp. will give decreasing values for K. (3) The preceding modifications take place whether the diastase be heated alone or in presence of maltose, which sugar, however, protects the enzyme to a certain extent against the influence of heat. (4) The coeff. of temp. K 35/K 25 is approx. 2, but diminishes as the saccharification temp. is raised. Even during the same transformation this coeff. of temp. is const. only when both the conversions under comparison proceed in accordance with the logarithmic law of unimol. reactions. C. A. N.

The Flavoring and Aromatic Constituents of Beer. C. J. LINTNER. *Z. ges. Brauw.*, 34, 586–9, 601–3.—According to their origin L. classifies the aromatic constituents of beer into 3 groups: Those originating (1) in the malt or barley, (2) the hops, (3) in the yeast and during fermentation. The flavoring constituents of barley are situated in the husk and are largely sol. in ether and alc. These substances are very stable and seem to pass into the beer without alteration. Hopping has a considerable influence on the flavor and aroma of the wort and beer. Hop oil consists at least of 5 different compds., the chief of them (humulin) being a sesquiterpene. The bitter flavor is due to 2 cryst. substances of acid character and complex comp., neither glucosides nor alkaloids, but non-nitrogenous compds, and probably forming derivs. of aliphatic terpenes. Although commonly termed α- and β-lupulinic acids, these should preferably be known as humilone and lupulinic acid on account of the divergent constitution. The flavoring constituents of beer or wort undergo extensive changes during fermentation; new metabolic products of which little is known are introduced by the action of the yeast. As to the origin of glycerol no accurate information is yet available. Proteins in colloidal condition although possessed of very little flavor of their own, are conductive to palatefulness, a property which should never be lacking. The CO_2 in beer has a decided influence on the flavor. C. A. NOWAK.

Experiments on the Behavior of Pentoses in Fermenting Mixtures. W. E. CROSS AND B. TOLLENS. Univ. Göttingen. *J. Landw.*, 59, 419–28.—Solns. of xylose, arabinose and rhamnose did not ferment in the absence of hexoses. In the presence of hexoses, the pentoses were not consumed when yeast ext. was the nutrient medium but were consumed appreciably in an artificial nutrient medium containing insufficient energy-yielding material. P. A. YODER.

Chemical Control in the Distillery. F. PALMA. Ingenio Nueva Baviera. *Rev. ind. agr. Tucuman*, 2, 55–9.—P. advocates chem. control and gives samples of tabulated results. G. A. ROUSH.

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The Distillation of Alcohol. A. B. ADAMS. *J. Ind. Eng. Chem.*, 4, 8–14.—Methods of distillation, kind of stills employed, and directions for detn. of impurities are given. The column still is minutely described. Much more efficient fractionation and much higher proof spirit can be obtained with the column still than with the old pot still. R. E. HUMPHREYS.

Action of Chlorine on Hexonic Acids (DREVERHOFF). 10. Intermediate Products in Alcoholic Fermentation (BRUHNS). 11C.

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17. PHARMACEUTICAL CHEMISTRY.

VIRGIL COBLENTZ.

The Bacterial Content of Apothecaries' Distilled Water. PAUL T. MÜLLER. Hyg. Inst. d. Univ. Graz. *Münch. med. Wochschr.*, 58, 2739–40.—Using his pptn. method (100 cc. of water treated with liquor ferri oxychlorati, stained by a conc. alc. gentian violet soln., centrifuged and the organisms counted in a field of known size (method to appear in full in the *Arch. Hyg.*)) M. examined 20 specimens of distilled water from apothecaries and found in the majority between 100,000 and 700,000 organisms in a cc. H. J. CORPER.

Julius Holtz. G. KRAEMER. *Ber.*, 44, 3395–8.—Obituary. E. J. C.

Production of Volatil Oils and Perfumery Plants in the United States. F. RABAK. U. S. Dept. Agr., Bur. Plant Ind., *Bull.* 195. E. J. C.

The Alkaloid Chemistry in 1910. OTTO HÜBNER. *Chem. Ztg.*, 35, 1369–70, 1395–7. E. J. C.

The Detection of Gum Ammoniacum and Gum Galbanum in Asafetida. H. M. SECHLER AND M. BECKER. *Am. J. Pharm.*, 84, 4–7.—On treatment with NaOBr, 10% emulsions of asafetida and galbanum each gave an olive-green color, ammoniacum a cherry-red, and a mixt. of the latter with asafetida a distinct transient red. Galbanum gives a reddish violet with H_2SO_4, the others no perceptible color. All 3 react the same with phloroglucinol and HCl. Galbanum and asafetida give a blue fluorescence with H_2SO_4 and NH_3. The oils obtained by steam distillation vary in n, asafetida 1.4974, ammoniacum 1.4765, galbanum 1.4840. An oil having a lower n than 1.4960 should be viewed with suspicion. H. C. FULLER.

Aromatic Spirit of Ammonia. L. A. BROWN. *Am. J. Pharm.*, 84, 7–14.—On account of the variability in comp. of $(NH_4)_2CO_3$, it is suggested that NH_4HCO_3, which is much more stable and which will answer the purpose in every way, should be substituted in making the aromatic spirit. For assay 25 cc. are made up to 500 cc. with H_2O, 50 cc. treated with a known excess of N H_2SO_4, the EtOH distilled off and detd. and the excess of acid titrated, from which the total amt. of NH_3 may be obtained. CO_2 is detd. in 100 cc. portions by pptg. with $Ba(OH)_2$ and either weighing the $BaCO_3$ or dissolving it in 0.1 N HCl and titrating the excess. When carefully stoppered and kept in a cool place the spirit deteriorated very slightly within 3 months. H. C. FULLER.

Colorimetric Test for Caramel. C. F. HALE. *Chem. Eng.*, 14, 475.—The color standard is made by treating 10 cc. of a soln. of $(NH_4)_2C_2O_4$ (0.0417 g. per l.) with 38 cc. H_2O and 2 cc. Nessler's soln. Against this is matched the caramel soln., prepared by dissolving 1 g. sample in 1 l. H_2O, running the soln. from a buret into a Nessler tube until on dilution with H_2O it matches. Standard caramel is considered that of which 0.01 g. (represented by 10 cc. of the dil. soln. made up to 50 cc. with H_2O) is required to match 50 cc. of the color standard. H. C. FULLER.

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Enbarim, a New Antisyphilitic. HEINRICH LOEB. Abt. Haut, Städt. Krankh., Mannheim. *Med. Klinik*, 7, 1853–5.—This is a 6% soln. of Na mercursalicylsulfonate and contains 0.5% acoin. 1 cc. contains 0.03 g. Hg. Its solns. give none of the common Hg reactions; NaOH gives no ppt. $(NH_4)_2S$ produces only a dark color, but no ppt.; gives no ppt. with albumin. P. J. HANZLIK.

Cyanogen Compounds of Tobacco Smoke. JULIUS TOTH. *Chem. Ztg.*, 35, 1262.—C_2N_2 compds. are completely converted into ferrocyanides by the $FeSO_4$ method in presence of sufficient excess of KOH. The presence of alk. carbonates does not affect the results. The results of a previous communication (*C. A.*, 5, 1133), showing large amts. of C_2N_2 compds. in tobacco smoke, are confirmed. J. M. JOHNSON.

Ammonia Content of Tobacco Smoke. W. VAUBEL. *Chem. Ztg.*, 35, 1331.—The change in color in petals of flowers caused by smoke from a burning cigar is due to NH_3. Cigar smoke from the mouth is gray, direct from a burning cigar is blue; the blue is probably caused by NH_3 associated with acids as CO_2, etc. The physiological effect of smoking may also be due to some extent to the NH_3 present.
J. M. JOHNSON.

Determination of Camphor in Powders without Volatilization. MARQUEYROL. *Ann. chim. anal.*, 16, 209–10.—Ten grams of the powder are extracted with Et_2O in a Soxhlet for about 10 hrs. The ethereal soln., decanted into a small, tared crystg. dish, is placed in a desiccator containing conc. H_2SO_4. It is then weighed every 10 min. until it ceases to lose wt. This residue is impure camphor. The camphor is detd. by diff., driving it off at 30–40°. W. REGNAULT.

A Reaction of Sparteine. A. JORISSEN. *Ann. chim. anal.*, 16, 412–3.—The codex of 1908 states that a pinch of sparteine sulfate causes a lasting orange-red color in yellow $(NH_4)_2S$. This test is more sensitive when carried out as follows: Dissolve in the smallest possible amt. of H_2O several cg. of sparteine sulfate, add a slight excess of NaOH, shake the turbid liquid with 10 cc. Et_2O, and when the latter has completely sepd. carefully decant the ethereal soln. of sparteine into a dry test tube. Then add 0.02–0.03 g. of dry S, shake well for 1 min., and pass H_2S into the liquid. This gives a voluminous bright red ppt. (sparteine polysulfide), disappearing on the addition of H_2O. One cg. of sparteine produces the ppt. very distinctly. Atropine and coniine alone give similar reactions, the former yielding a yellow ppt., the latter an orange-yellow turbidity with H_2S. Sparteine, however, does not give the Vitali reaction and differs from coniine in m. p. solubilities, etc. WALTER REGNAULT.

The Bitter Constituent of Andrographus paniculata, Nees. K. GORTER. *Rec. trav. chim.*, 30, 151–60.—Boorsma was the first to isolate from different parts of the plant a colorless, neutral, cryst. substance, andrographide, $C_{20}H_{30}O_5$, m. 217° (decomp.) $[\alpha]_D^{20} = -126$. G. proved it to be a lactone, as shown by its behavior toward alkalies, and changed the name to *andrographolide*. *Triacetylandrographolide*, $C_{26}H_{37}O_5Ac_3$, m. 129°, is prepared by the aid of Ac_2O. *Andrographolic acid*, $C_{20}H_{32}O_6$, needles, m. 188°, $[\alpha]_D^{20} = +0.14$, is obtained by dissolving andrographolide in alkali. The needles, recryst. from MeOH, fuse at 188° with decrepitation. Colorless soln. with alk. This alk. salt has a neutral reaction and cryst. with 2 mol. of H_2O. *Dibromotriacetylandrographolide*, $C_{20}H_{27}O_5Ac_2Br_2$, white needles, m. 174–5°. A higher Br substitution product could not be obtained. Its conduct shows that at least 1 double linkage must be present. Andrographolide is also able to combine with 3 mol. of HBr.
W. REGNAULT.

Constituents of the Seeds of Casimiroa edulis. FREDERICK B. POWER AND THOMAS CALLAN. Wellcome Chem. Research Labs., London. *J. Chem. Soc.*, 99, 1993–2010; *Proc. Chem. Soc.*, 27, 257; *Pharm. J.*, 87, 623.—"Zapota blanco" of the Mexican pharma-

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copea, is the term applied to the fruit and seeds of *Casimiroa edulis*, La Llave and Lejarza. The fruit is an anthelmintic and the seed a vulnerary. The seed shells contain an essential oil, traces of an alkaloidal *substance*, sugar, free stearic acid and resinous material. The kernels contain an essential *oil*; d_{20} 0.9574; α_D 2°25′ (25 mm. tube). The other substances found were as follows: (1) An alkaloid, *casimiroine*, $C_{22}H_{14}O_6N_2(OMe)_2$; needles, m. 196–7°. *Picrate*, yellow needles, m. 165°. *Chloroaurate*, $C_{24}H_{20}O_6N_2.HAuCl_4$, orange-yellow needles, m. 195–6°. Alkalies hydrolyze casimiroine to *casimiroitine*, $C_{22}H_{22}O_7N_2$; prisms, m. 171°. A *base* is also produced; needles, m. 159°. Conc. HCl converts casimiroine into an *acid*; m. above 300°. (2) An alkaloid *casimiroidine*, $C_{17}H_{24}O_5N_2$; small needles, m. 222–3°; in aq. HCl, $[\alpha]_D$ —36.5°. *Chloroaurate*, $C_{17}H_{24}O_5N_2.HAuCl_4.2H_2O$; yellow needles, m. about 90°, when anhydrous, m. 145–8° (decomp.). (3) BzOH. (4) Probably a trace of salicylic acid. (5) A sugar giving *d*-phenylglucosazone. (6) A resin which contained sitosterol, ipuranol, palmitic, stearic, oleic, linolic and linolenic acids and a lactone, *casimirolide*, $C_{24}H_{28}O_6$; prisms, m. 229–30°; in $CHCl_3$, $[\alpha]_D$ —49.2°. It is hydrolyzed to *casimiroic acid*, $HOC_{22}H_{26}O_4CO_2H$; needles, m. 207°; in abs. alc., $[\alpha]_D$ —86.8°. *Sodium* and *silver salts*. *Methyl ester*, m. 108–10°. *Acetyl derivative*, needles, decomp. above 142°. A *phenol*, $C_{16}H_{12}O_6$, yellow needles, m. 215–8°. Contrary to the results of others no definit glucoside or "glucoalkaloid" could be isolated. The seeds and the above constituents were devoid of definit physiological activity. J. BISHOP TINGLE.

Agathin-Salicylaldehyde Methylphenylhydrazone. K. SCHUSTER. *Z. allg. Oest. Apoth. Ver.*, 1911, 337; through *Pharm. J.*, 87, 593.—Agathin, $(CH_3C_6H_4NN : CHC_6H_4OH)$ is obtained by mixing at ordinary temp., mol. equivalents of asym. methylphenylhydrazine and salicylic aldehyde; after some hrs. recrystallize from hot EtOH. White cryst. laminas, greenish tinge, m. p. 74°. Tests are given; some are based on liberation of salicylic acid and of phenylhydrazine. 0.03 g. dissolved in 2–3 cc. H_2SO_4 produces brownish yellow; if a trace of strong HNO_3 is then added, color changes to blue and green. On long standing the yellow color reappears. A little agathin moistened with HNO_3 evolves NO gas; the mixt. becomes blue, then quickly green, with partial charring; if H_2O is added at once, an olive-green ppt. is formed, if added after standing, a brown ppt. S. WALDBOTT.

Dichloroethylene. R. R. BENNETT. *Pharm. J.*, 87, 623.—Dichloroethylene, $C_2H_2Cl_2$, should not be confused with "dichloride of ethylene", $C_2H_4Cl_2$. The former has a sp. gr. of 1.25 and a b. p. of 55°. A 2.5% soln. of I in dichloroethylene is being used in the place of tincture of I to sterilize the skin before operations. It is preferred because of the absence of unpleasant lachrymation or catarrhal effects upon evapn. of the solvent. S. W.

Chemical Examination of the Leaves of Anona muricata. THOMAS CALLAN AND FRANK TUTIN. Wellcome Chem. Research Labs., London. *Pharm. J.*, 87, 743–5.—The leaves are used, *e. g.*, in fever, nervousness, and as an anthelmintic. The authors examd. dried leaves from Dominica, W. I. The alc. ext. by distillation with steam yielded a small amt. of essential oil of strong, not unpleasant odor. The water-sol. portion of the alc. ext. contained much KCl, dextrose, tannin, amorphous products and a small amt. of an alkaloid which could not be crystallized. The portion of the ext. insol. in H_2O was a dark green resin, largely fatty matter. From this resin were isolated: Myricyl alc., sitosterol, $C_{27}H_{46}O$, a mixt. of fatty acids consisting largely of oleic, linolic and stearic acids, together with a higher fatty acid, possibly lignoceric acid and *anonol*, $C_{22}H_{36}O_2(OH)_2$ (m. p. 294–8°). Its diacetyl deriv. m. 166°, its dibenzoyl deriv. at 197–8°. S. W.

Extract of Male Fern. ERNEST J. PARRY. *Pharm. J.*, 87, 778.—Authentic samples prepared by P. gave these criteria: 1. d_{15} 1.004–1.025, should not fall below

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1.000; 2. n_D^{20} should be 1.505–1.509, not less than 1.500; if the ext. is too dark, it is mixed with an equal vol. of castor oil of known n; that of the ext. is then calc. 3. Solubility in 10 vols. of petrol. ether should be complete; no oil should sep.; some flocculent matter may sep. 4. Sapon. value should be between 230–50, and amt. of unsaponifiable matter 8–11%. 5. Fatty acids should have a combining wt. of 240–55. 6. Crude filicin detd. by official method of Swiss Pharmacop. is usually 22–8%; should not be less than 20%. Of 20 com. samples examd., 19 were found adulterated with 30–60% of castor oil. S. W.

Loss of Camphor from Cardboard Cartons. ALEX. GUNN. *Pharm. J.*, 87, 811.—10½ oz. of camphor in a cardboard carton, kept on a shelf in a cold warehouse during the 6 winter months lost 11% per year; cf. C. H. La Wall, *C. A.*, 4, 235 and J. C. Folger, *Yearbook of Pharm.*, 1886. Camphor should be kept in containe s of Sn or glass. S. W.

Solubility of Magnesium Sulfate. ATHERTON SEIDELL. *Pharm. J.*, 87, 846.—Reply to J. Lothian (*C. A.*, 4, 1719). Solubilities of the salt $Mg(NH_4)_2(SO_4)_2.6H_2O$ in 100 g. H_2O as recalc. by S., are as follows: At 34° F., 14.0 g.; at 41° F., 16.8 g.; at 50° F., 20.3 g.; at 59° F., 23.9 g.; at 60° F., 24.2 g.; at 70° F., 28.2 g.; at 81° F., 33.1 g. S. W.

Crystallin Deposits in Infusion of Senna. J. W. PLENDERLEITH. *Pharm. J.*, 87, 884–5.—An H_2O infusion of senna leaves deposited white crystals of Ca tartrate, $CaC_4H_4O_6.4H_2O$, corresponding to 2.28% in dry Alexandria leaves. P. found the salt to be sol. in 1990 parts of H_2O at 15.5°, and 405 parts at 100°. Yellow crystals ($C_{14}H_{10}O_6$, Tschirch and Hiepe, 1901) were also formed, amtg. from 10 to 100% of the deposit in 10 samples. S. W.

Volumetric Determination of Mercury in Mercurial Preparations. W. B. COWIE. *Pharm. J.*, 87, 885.—About 10 g. of the ointment are boiled with 200 cc. of 0.5 *N* alc. KOH under a reflux condenser until the Hg is pptd., using a reducer if necessary, *e. g.*, CH_2O. Decant the soap soln., wash the pptd. Hg with H_2O, filter washings through asbestos wool, dissolve the total Hg in 5 cc. HNO_3, sp. gr. 1.42, make up to 100 cc., treat 20 cc. with some ferric soln. and titrate with KSCN soln. of which 1 cc. is equiv. to 0.1 g. Hg. Such preps. as Pil. Hydrarg. can be titrated direct after soln. in HNO_3. Paraffin as ointment base is removed by benzine. Results were accurate for preps. with free Hg; those with Hg compds. were on an av. 0.5% too low. S. W.

Note on Cinnamon Water. J. TAIT. *Pharm. J.*, 87, 886.—Cinnamon water distilled from the bark of Ceylon cinnamon deposits crystals of cinnamic acid and develops a distinct benzene odor (of styrene). When diluted with tap water it also develops a fungus growth. [See Enz (1881), Oliviero (1906) and Herzog and Ripke (*C. A.*, 3, 1537)]. Upon evapn. of the diluted water, a distinct odor of coumarin replacing that of styrene was observed by T. S. W.

Modern Problems of Pharmacognosy. A. TSCHIRCH. *Schweiz. Wochschr.*, 49, 665–9, 679–83.—Comprehensive outlook based on close relation of pharmacognosy with almost all branches of natural sciences. S. W.

Formation of Active Principles of Medicinal Plants in 1911. JAMES BURMANN. *Schweiz. Wochschr.*, 50, 2–3.—A chart giving results since 1907 shows that in 1911 the amt. of alkaloids in 5 medicinal plants examd. was higher than in at least the 3 preceding yrs. The plants with one exception came from the Swiss districts of Aigle and St. Maurice. In 1911 (cf. *C. A.*, 5, 1493), *Aconitum napellus* showed 0.094% aconitine; *Atropa belladonna* 0.099% atropine; *Colchicum autumnale* 0.200% colchicine; *Digitalis ambigua* 0.148% digitoxine. *Digitalis purpurea* from Barr, Alsatia (cf. *C. A.*, 6, 410) showed digitoxine: 0.078% in 1907; 0.063% in 1908; 0.033% in 1909;

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0.037 in 1910 and 0.070% in 1911. All plants, however, were less developed in 1911 than those of preceding yrs. S. W.

Essence of Seseli bocconi (FRANCESCONI, SERNAGIOTTO). 10. Oils from Fruits of Palms (HÉBERT). 27. Determination of Cinnamic Acid by Bromine (JONG). 7.

U. S., 1,013,913, Jan. 9. J. WEMER. **Medicinal solution containing free iodine.**

U. S., 1,014,198, Jan. 9. G. ZUELZER. **Non-toxic suprarenal preparation.**

U. S., 1,014,859, Jan. 16. L. TAUB and H. HAHL. **Glycol benzoate, of the formula** $C_6H_5.COO.CH_2.CH_2.OH$.

Ger., 230,035, June 29, 1909. H. DREMO. **A tube for salve. The salve is pushed** out by means of a piston.

Ger., 230,639, Apr. 17, 1909. E. M. BAJON. **A dose-measuring device for medicins.**

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18. ACIDS, ALKALIES, SALTS AND SUNDRIES.

T. LYNTON BRIGGS.

Some Views on the Present Condition and Prospects of the Inorganic Chemical Industry in its Technical and Economic Aspects. MAX HASENCLEVER. *J. Soc. Chem. Ind.*, 30, 22, 1291–4.—Lecture. W. W. SCOTT.

Plants for Making Ammonium Sulfate. C. G. ATWATER. *Progressive Age*, 30, 15–22; cf. *C. A.*, 5, 1485. C. A. COLE.

Technical Use of Zirconium Earths. C. R. BÖHN. *Chem. Ztg.*, 35, 1261–2.—Extreme resistance to chem. and physical agents makes ZrO_2 valuable as crucible material. Zr borates are used in glasses and enamels and in ceramic industries. In the latter, Fe-free ZrO_2 is necessary, the cheap production of which is now assured. Mention is made of the use of Fe-Zr in steels and of ZrO_2 as furnace linings especially of elec. furnaces. Great resistance of ZrO_2 to heat promises its application as a fire brick material. Zr carbide is used as abrasive and as a substitute for diamond in cutting glass. Being absolutely non-toxic, ZrO_2 is used in place of Bi nitrate or carbonate in Röntgen-therapy. It has value medicinally. Pure ZrO_2 is a soft white powder and may be used as a pigment. It has good covering power and is resistant to acids, alkalies and H_2S. J. S. GOLDBAUM.

Report of the Royal Austrian Inspectors of Industries Concerning their Work in 1910. ANON. *Chem. Ztg.*, 35, 1332.—A disastrous explosion was found to have been caused by particles of Fe entering a mill for powdering sugar; the feed must now pass under a powerful electromagnet. Another explosion was caused by the sucking back of sugar liquor into a cylinder of liquid SO_2, the valve of which became clogged and the cylinder subsequently heated by some neighboring app.; an efficient back-action valve was installed. Oil burning was found more satisfactory for kilns and furnaces requiring intense heat than for generating steam. A no. of reforms were instituted where it was found that workmen were exposed to poisonous fumes and dust. These included: The substitution of CCl_4 for CS_2 in fat extraction, dust traps in cyanamide mills, substitution of sesquisulfide for yellow P in match factories, installing closed tanks and pipes under slight partial pressure in NaCN works, closed chambers for vinegar generators to avoid CH_3CHO fumes, respirators for workmen casting brass, and a new, entirely enclosed machine for type casting. Numerous poisonings in a dynamite works were found to be due to nitrous fumes caused by cleaning the acid mixt. tanks with water; conc. H_2SO_4 is now used. A large Pb color works has reduced the occurrence of Pb poisoning by causing its employees to wash their hands in 3% HNO_3 before using

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soap and water. Cuts are given of a portable furnace, entirely enclosed, to be used by iron founders, by means of which a blast of hot air is forced through molds in order to dry them before casting; this obviates the necessity for the usual open coal fires which fill the air with fumes and CO. The condition of numerous centrifugal machines was found to assure future accidents. A. F. SEEKER.

The Function of the Laboratory in the Training of an Engineer. F. W. MARCHANT. *Electrician*, 68, 387. G. F. YESSLER.

Production of Hydrogen in the Dry Way. A. SANDER. *Chem. Ztg.*, 35, 1273–4. —Four methods have been employed: (1) A mixture of Zn dust and dry $Ca(OH)_2$ (kept ready for use in tightly soldered tin boxes) when heated to redness in suitable retorts evolves H; this process has not found extended use. (2) By decomposing hydrocarbons (*C. A.*, 5, 778). (3) By the combustion of "Hydrogenit," a mixt. composed of ferrosilicon (90–95% Si) 25 pts., NaOH 60 pts., and $Ca(OH)_2$ 20 pts., the whole reduced to a fine powder, intimately mixed, and pressed into bricks. Each brick weighs 25–50 kg., produces 8–16 cm. of H, and being hygroscopic must be sealed in tin boxes for storage. The generators are furnished with tight covers fitted with a small hole through which a hot wire is inserted for igniting the charge, the latter being surrounded by a small interior jacket containing water. After starting the combustion the brick burns quickly, without flame, generating great heat and evolving H. The water in the jacket escapes into the charge as steam, increasing the yield of H. For purification the gas is passed successively through water, coke and sawdust. The requisit app. weighs 900 kg. making it suitable for use in military campaigns. Powdered Al or Zn may be substituted for ferrosilicon in the mixt. (4) By passing CO over soda-lime heated to 250° $NaCO_2H$ is formed, which in the presence of excess of NaOH, upon further heating to 300° evolves H and passes into Na_2CO_3. A similar reaction takes place at lower temps. (180°) with potash-lime. This process has not appeared in practical form. A. F. SEEKER.

U. S., 1,013,181, Jan. 2. A. KLAGES and H. VOLLBERG. **Making chlorosulfonic acid.**

U. S., 1,013,460, Jan. 2. L. L. SUMMERS. **Making nitrogenous compounds.**

U. S., 1,013,511, Jan. 2. P. PIPEREAUT and A. VILA. **Making pure zinc sulfide and thiosulfates.**

U. S., 1,013,638, Jan. 2. T. L. BRIGGS and H. F. MERRIAM. **Making oleum.**

U. S., 1,013,657, Jan. 2. F. W. HIGGINS. **Making abrasive articles.**

U. S., 1,013,791, Jan. 2. L. LÖWENSTEIN. **Making hydrogen peroxide from impure persulfuric acid solutions.**

U. S., 1,013,881, Jan. 9. C. H. KÖHN. Leipzig-Lindenau, Ger. **Method of and apparatus for vaporizing volatil constituents of liquids.**

U. S., 1,013,984, Jan. 9. C. BOSCH and W. WILD. **Making pure calcium nitrate.**

U. S., 1,014,040, Jan. 9. A. E. BOSSE. **Ammonia generator.**

U. S., 1,014,314, Jan. 9. G. M. MARSHALL. **Soda calciner.**

U. S., 1,014,418, Jan. 9. F. SHUMAN. **Utilizing the waste heat of distillation.**

U. S., 1,014,740, Jan. 16. H. STRECKER-AUFERMANN. **Preparing grained printing plates by photography and etching with $FeCl_3$ soln.**

U. S., 1,014,793, Jan. 16. G. WEINTRAUB. **Obtaining titanic oxide and ferrous sulfate from ilmenite.**

U. S., 1,015,133, Jan. 16. H. J. BREEZE. **Tire-filling composition.**

U. S., 1,015,145, Jan. 16. H. S. DAVIS. **Ammonia still.**

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U. S., 1,015,220, Jan. 16. E. TEISLER. **Making sodium aluminium fluoride.**

Ger., 228,927, Feb. 23, 1910. H. SIEWERS. In the **heating of bodies** by the heat of condensation of gases, the bodies are washed in the condensation chamber by the gases which are alternately condensed and expanded, heat being introduced from without during a portion of the stroke.

Ger., 231,493, Apr. 18, 1909. FR. C. WICKEL. In the production of **substitutes for metal-foil surfaced articles**, a thin impermeable paper such as "pergamyn" silk paper is coated on one side with molten carnauba wax carrying bronze metal powder. The impressions produced on this paper do not tarnish because of the wax, which prevents oxidation.

19. GLASS AND CERAMICS.

G. E. BARTON, A. V. BLEININGER.

The Preparation of Colloidal Coloring Materials in Glasses and other Materials by the Electric Discharge during the Eighteenth Century. J. DONAU. *Z. Chem. Ind. Kolloide*, 9, 146–7.—A quotation from Tiberius Cavello's book "Vollstandige Abhandlungen, etc.," 4th ed., 1797. If the current from a Leyden jar is passed through a thin sheet of metal which is closely pressed between 2 layers of glass, the metal is so combined with the glass that it cannot be removed by any ordinary solvents, and the glass becomes colored. Silk could be impregnated with a metal in the same way.

H. ISHAM.

Imitation Mat Glass. M. T. K. *Diamant*, 33, 1079.—A fine grade of chalk is suggested to replace the white lead usually employed in coating the glass.

J. B. PATCH.

Seamless Wall and Floor Linings of Glass. *Diamant*, 33, 1116–7.—A wire network is placed close to the rough bricks and the intervening space filled with broken glass. The whole is then fused together with small gas burners. If desired, the wire network may be removed and the softened surface rolled with stamped steel cylinders leaving a design upon the wall or floor. Pleasing effects are produced by fusing powdered colored glasses into the pattern. J. B. P.

The Importance of Electric Welding in the Plate and Enamel Ware Industry. J. SAUER. *Glashütte*, 41, 996–7, 1020–2, 1042–3, 1064–5 (19 illus.).—The article merely explains the illus. J. B. P.

Casting Clay Articles. R. F. *Glasind.*, 22, Nos. 46–9.—F. deals with the comp. and treatment of the batch in a general way, giving no complete recipes. J. B. P.

Glass Melting Furnaces and their Heating Arrangements. H. SCHNURPFEIL. *Glashütte*, 41, 330–1, 350–1, 373–5, 393–5, 417–9, 437–8, 469–70, 489–90, 513–4, 533–4, 557–8; 577–8, 601–2, 621–2, 645–6, 665–7, 689–90, 709–10, 734–5, 760–1, 785–6, 836–7, 859–60 (83 illustrations).—This article is treated under the heads: Pot furnaces; tank furnaces; gas producers; melting furnaces using oil for fuel; and electric melting furnaces. G. E. BARTON.

Cost of Manufacture of Granitoid Tile. ANON. *Tonind. Ztg.*, 35, 1480.

W. L. BADGER.

Soils in Kruszynia (Poland). J. BURIAN. *Chemické Listy*, 5, 208–11, 237–43; cf. *C. A.*, 5, 1961.—The chem. comp. of these soils is such as to be suitable for the manuf. of brick. P. J. HANZLIK.

U. S., 1,013,603, Jan. 2. G. KEPPELER and A. SPANGENBERG. **Increasing the plasticity and binding power of clay, kaolin, etc.**

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Ger., 230,610, Feb. 1, 1910. P. Scharf. **Substitutes for glass,** suitable for covering pictures, consisting of transparent elastic skins of plant glue such as the root substance of amorphophallus varieties. The skins are steamed, stretched and dried.

Ger., 230,833, Aug. 26, 1909. E. Weiss. **An oven for cooling bottles and other glass ware.** The shaft is provided with a channel extending from the lateral charging opening on one side in the lower third of the shaft to the emptying opening on the opposit side. Endless chains are provided, by means of which the bottles are carried upwards and downwards. On its inner wall the cooling channel is provided with 3 channels and on its outer walls there are 4 passages to be regulated in such manner that the heating means can be admitted at any point and withdrawn where desired. The carriers of the bottles, perforated to allow passage of the heating means, are in the cooling chambers.

Ger., 230,988, June 29, 1909. J. Porta. App. for **introduction of bottles into cooling furnace.**

Ger., 231,058, May 11, 1910. V. H. Gregory. **In a tilting glass furnace,** the construction of the draught channel so that any collection of molten glass will flow back into the furnace.

Ger., 231,858, Aug. 19, 1909. L. Grote. **Glass-blowing machine** in which the turn-table bearing the preliminary mold and the head mold is stopped by an elastic lock-bolt.

Ger., 232,377, Oct. 27, 1909. G. Lenthérie and J. Habert-Dys. Manuf. **of decorated glass articles.**

20. CEMENT AND OTHER BUILDING MATERIALS.

C. N. WILEY.

Constitution of Portland Cement Clinker. E. Jänecke. *Chem. Ztg.*, 35, 1289–91; *Z. anorg. Chem.*, 73, 200–22.—The presence of Al_2O_3 being necessary for the formation of $3CaO.SiO_2$ it is shown that this is really a ternary compd.—alit—$8CaO.2SiO_2.Al_2O_3$, analogous to other ternary compds. found in nature-meionite, $4CaO.6SiO_2.3Al_2O_3$; sarkolite, $7CaO.6SiO_2.2Al_2O_3$; gehlenite, $3CaO.2SiO_2.Al_2O_3$; anorthite, $CaO.2SiO_2.Al_2O_3$; and grossularite, $3CaO.3SiO_2.Al_2O_3$. Boudouard synthesized $2CaO.SiO.Al_2O_3$ and the Fe substitution products are analogous to the Al_2O_3 compds. $8CaO.2SiO_2.Fe_2O_3$ in thin sections shows 2 distinct layers—one red, the other colorless. No compds. between CaO-SiO_2 and Fe_2O_3 are present in clinker on account of the low CaO content. From the Kgl. Materialprüfungsamt tetrahedral diagrams (*C. A.*, 5, 3140) clinker comp. is found to lie within the tetrahedron bounded by CaO, $3CaO.Fe_2O_3$, $2CaOSiO_2$ and $8CaO.2SiO_2.Al_2O_3$, the following table giving the % of the 4 compds. in the boundary mixts. (cf. *C. A.*, 5, 1982).

	$8CaO.2SiO_2.Al_2O_3$.	$2CaO.SiO_2$.	$3CaO.Fe_2O_3$.	CaO.	$CaO.2SiO_2.Al_2O_3$.
Average	47.15	39.7	5.75	7.4	...
Highest CaO	42.2	33.1	8.00	16.7	...
Lowest CaO	43.4	49.3	3.5	..	3.2
Lowest SiO_2	52.6	26.4	7.9	13.1	...
Highest SiO_2	39.5	55.8	3.5	1.2	...
Lowest Al_2O_3	29.6	52.1	5.9	12.4	...
Highest Al_2O_3	65.8	26.4	5.3	2.5	...
Lowest Fe_2O_3	49.9	43.6	1.8	4.7	...
Highest Fe_2O_3	44.1	35.8	4.1	10.5	...

Free CaO may be present rizing, in the highest limed clinkers to 16.7% and in the

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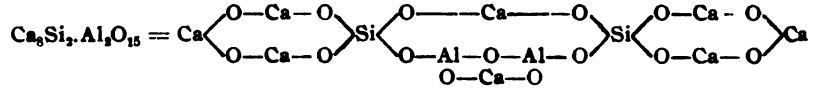
$3CaO.Fe_2O_3$ to 10.5%. According to the best authorities, $8CaO.2SiO_2.Al_2O_3$ has previously been considered a quaternary mixt. of $3CaO.SiO_2$, $2CaOSiO_2$, $3CaOAl_2O_3$ and CaO; which is disproven by J.'s thermal and optical measurements. The mix. was melted in an Ir crucible with a removable bottom and separable sides by means of an O-H blow-pipe. It was then pulverized, returned to the crucible with a thermocouple and heated to 1650–1700° in an elec. furnace composed of 2 magnesia cylinders with retort C as a resistor. The cooling curve was then taken and a definit m. p. found at 1382°. It is the principal const. of Jornebohm's alit and has the const. formula



The melt is white with a trace of green; it is unaffected by moist air; in water there is a sepn. of non-cryst. $Ca(OH)_2$, the residue being converted into small, homogeneous, weak doubly refracting crystals which were not changed by long contact with H_2O. The reaction is $8CaO.2SiO_2.Al_2O_3 + H_2O = x(Ca(OH)_2) + (8-x)CaO.2SiO_2.Al_2O_3yH_2$; the values for x and y were not estd. but are probably small. A. J. PHILLIPS.

Colloid Theory of Cement. C. H. DESCH. *Cement*, 12, 192.—Micro-exam. shows that the action of water on the alit crystals of cement hydrolyzes the aluminates and silicates. The former become cryst. but the hydrated metasilicate being very insol. seps. as a gel. A portion of the CaO from the silicate crystallizes and the remainder in soln. is absorbed through the shrinkage and desiccation of the gel through a long time. A. J. P.

The Ratio of the Components of Concrete. ANON. *Tonind. Ztg.*, 35, 1478.—A protest against expressing the comp. of concrete as a ratio; use the % of total vol. recommended. The % comp. changes very rapidly with change in ratio when the ratio is low, and very slowly when the ratio is high. Due to diff. in % voids, a 1 : 2 : 2 mixt. may not be equivalent to a 1 : 4. W. L. BADGER.

Cement. B. BLOUNT. *Engineering*, 92, 771–2.—A lecture discussing the testing and chemistry of cement. A. J. PHILLIPS.

Comparative Tests of Cement Gun and Hand Applied Concrete. C. M. CHAPMAN. *Eng. News*, 67, 26.—In tensil strength the gun work exceeds by amts. ranging from 20–260%, in compression 20–720%, and surface permeability is 0.7–0.05 as great as hand work. Absorbtion in hand work was 1.4–5.3 times as much as the gun work, the latter having 52–75% of voids of the former. Adhesion was 27% better. A 1/4 mix was used for the tests but in every case the gun coatings were richer than the original mix, due to loss of sand by rebounding. A. J. PHILLIPS.

Hydration and Hardening of Cement. A. MOYE. *Tonind. Ztg.*, 35, 1507.—Reply to Rohland (*C. A.*, 6, 144). W. L. BADGER.

Standard Specifications for Cement Sewer Pipe, Portland, Ore. T. M. HULBURT. *Eng. Contracting*, 36, 684–5. A. J. P.

Reinforced Concrete Regulations. ANON. *Eng. News*, 67, 98–102.—Cleveland, O., and New York, N. Y., has recently adopted official building laws for the regulation of reinforced concrete construction. These are given. E. J. C.

Dust in Portland Cement Plants. OTTO SCHOTT. *Eng. News*, 67, 110–4. E. J. C.

Rusting of Iron in Concrete. E. DONATH. *Z. angew. Chem.*, 24, 2355–6.—Polemical against Rohland (*C. A.*, 5, 3723). A. J. PHILLIPS.

The Wet or Dry Process (for Cement). CALAME. *Tonind. Ztg.*, 35, 1348–9.—C. describes 2 plants using the wet process; he shows why 1 is successful and why the

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other should use the dry process, the diff. being mainly due to the diff. in the moisture content of the raw materials. W. L. BADGER.

Problems Involved in the Selection of Machinery for the Manufacture of Portland Cement. PAUL C. VAN ZANDT. *Eng. News*, 66, 700–4.—A discussion of Portland cement mfg. with special reference to the machinery needed and the installing of it. H. M. PLUM.

The Operation of the Lime Kiln. GÉNARD. *Chemisté*, 2, 337–9.—Control of a kiln depends on the analysis of the stone and coke entering and the gas leaving the furnace. Examples are given for the calculation of a charge from the raw mix analyses and the following deductions drawn from the gas analysis. An excess of O is due either to high draft or insufficient crushing of coke. Deficiency in CO_2 is due to presence of excess of coke or too rapid charging. Irregularity in CO_2 % is due to too great an interval between charges or to defective draft. An excess of CO with no excess O results from incomplete combustion due to too heavy a charge or poor draft and excess of CO with O shows leakage of air into the kiln. A. J. PHILLIPS.

Valuation of Limestones for Calcination. J. S. GRASTY. *Mining World*, 35, 641–2.—The impurities in limestone on calcination are assumed to form $2CaO.SiO_2$, $3CaO.Al_2O_3$ and $3CaO.Fe_2O_3$. Calculations are given for a stone analyzing $CaCO_3$ 85.66, $MgCO_3$ 6.49, SiO_2 6.65, Al_2O_3 1.30, Fe_2O_3 0.51, showing that 26.94 $CaCO_3$ are required by the impurities leaving only 58.72 $CaCO_3$ or a ton of this stone would yield only 730.99 lbs. of uncombined CaO. The use of such impure stone for calcination or fluxing is decried. A. J. P.

Rejection of the Le Chatelier Test. O. STREBEL. *Deut. Verband. Materialprüfungen der Technik; Tonind. Ztg.*, 35, 1508–9.—The Le Chatelier test for constancy of vol. was adopted in 1909 by the Intern. Soc. for Testing Materials. S. presents the results of tests made on 6 cements by 10 labs.; the results vary so widely that it is concluded that the test should be dropped. W. L. BADGER.

Rapid Destruction of Timber Beams from Dry Rot. C. H. SMITH AND F. J. HOXIE. *Eng. News*, 66, 727–9.—The increase of dry rot is perhaps due to the use of an inferior quality of lumber. A discussion of the prevention of timber rot is given and cures are suggested where the rot has already developed. H. M. PLUM.

Naphthalene in Road Tars. I. Effect of Naphthalene upon the Consistency of Refined Tars. P. HUBBARD AND C. N. DRAPER. *J. Ind. Eng. Chem.*, 3, 903–7.—The fluxing value of naphthalene for tar pitches is somewhat greater than the heavier naphthalene-free tar distillates up to satn. It has a greater effect on the fluidity of hard pitches than on the soft ones. Beyond the satn. point, fluidity decreases at temp. below the m. p. of naphthalene and *vice versa*, irrespective of the free C content of the tar. A. J. PHILLIPS.

Creosoting Paving Blocks. JOHN ERICSON. *Mun. J. Engr.*, 32, 9–10.—An abstract of a report by the City Engineer on conditions in Chicago, with particular reference to "bleeding." LANGDON PEARSE.

Temperature of Pavements. H. C. HOTTEL. *Mun. J. Eng.*, 32, 54–5.—Expts. were made in Trenton, N. J., on the temp. of various pavements in summer. The rise was from hottest to lowest in order: Asphalt, asphalt block, mack brick, granit block, metropolitan brick and wood block. L. P.

Magnesia in Cement. A. MOYE. *Zement u. Beton*, 10, 426; through *Z. angew. Chem.*, 24, 1883.—A review of Jesser's work who concludes that MgO can combine with Al_2O_3 to form spinel only in case both free CaO and MgO are present. They dissolve in alit. MgO can also replace the CaO of Ca silicate as in nature. A. J. PHILLIPS.

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Antiseptic Effect of Creosote Oil (WEISS). 22.

U. S., 1,014,015, Jan. 9. N. E. McLOON. **Lime kiln.**

U. S., 1,014,221, Jan. 9. A. HERMANN. **Apparatus for making plates of artificial stone.**

U. S., 1,014,995, Jan. 16. P. F. APFEL and N. B. APFEL. **Cement material** containing MgO and $NaHCO_3$.

21. FUELS, GAS AND COKE.

J. D. PENNOCK.

Oil Fuel for Steam Boilers. B. R. T. COLLINS. *New Eng. Engineer*, 3, 16–24; cf. *C. A.*, 5, 3337.—Seven expts. by the Pacific Light and Power Co. show the following averages with an oil-burning equipment, applied to a 604 h. p. Babcock and Wilcox boiler furnished with a Hammel furnace and burners: Heating surface, 6042 sq. ft.; temp. of flue gases, 435.5 F.; Co_2, 13.2%; excess of air, 21.2%; steam used by burners to atomize oil, 2.15%; range of efficiency, 72.7% to 83.3%; av efficiency for 7 tests, 80.47; av. evap. at and from 212° F., 15.23 lb. LOUIS W. RIGGS.

The Purposes and Value of Regular Analytical Control of Coal. O. MOHR. Berlin. *Chem. Ztg.*, 34, 1143.—A discussion. E. J. WITZEMANN.

Deterioration and Spontaneous Heating of Coal in Storage. H. C. PORTER AND F. K. OVITZ. *J. Ind. Eng. Chem.*, 4, 5–8; cf. *C. A.*, 5, 3510.—Conclusions: Coal should not be piled over 12 ft. deep nor so that any point in the interior will be over 10 ft. from an air-cooled surface. If possible store only lump and keep dust out to reduce handling to a minimum. Pile so that lump and fine are distributed as even as possible and prevent lump from accumulating at base of pile and forming air passages. Allow 6 weeks' seasoning after mining before storing, rehandle and screen in 2 mos. and keep away from external sources of heat. Do not try to ventilate by pipes, avoid alternate wetting and drying and admission of air into pile through interstices around foreign bodies such as timbers, etc. C. A. COLE.

Combustion test on Locomotive. ANON. *The Black Diamond*, Sept. 2, 1911; through *New Eng. Engineer*, 4, 22–4.—The paper gives details of an experimental trip of a Lehigh Valley locomotive with a train on a run from Buffalo to Jersey City. Distance, 446.6 miles, speed, 41.8 miles per hr., coal consumed 15 tons, coal used per ton mile, 0.128 lb. The usual consumption on this run is 25 to 30 tons. The saving was effected by careful intelligent firing. LOUIS W. RIGGS.

Losses in the Boiler Room and How they May be Measured. E. A. UEHLING. *New Eng. Engineer*, 3, 58–61.—The combustion of coal is explained with graphic representation of the vols. of CO_2, O and N when a given wt. of C is burned with different vols. of air. There is given a description and sketch of app. for removing and testing flue gases for CO_2. LOUIS W. RIGGS.

Carbon Dioxide and Boiler Efficiency. E. A. UEHLING. *Power*, 34, 847; cf. *C. A.*, 6, 417.—A series of analyses of flue gas in support of the statement that "high or low CO_2 means high or low efficiency." Since with a uniform stack temp. the wt. of gas per lb. of fuel burned increases as the CO_2 decreases, if the heat waste up the chimney increases as the CO_2 decreases, it follows that a large amt. of CO_2 indicates high boiler efficiency. The % of CO_2 does not measure the efficiency since it is a loss factor, but serves as an indicator in firing. W. L. VAN KEUREN.

Determination of Sulfur in Gas. C. W. SOMERVILLE. *J. Gas Lighting*, 116, 676.—S. replies to the criticisms of the Somerville Test, *viz.*: (1) That the results

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should be corrected by an addition of 6%, because all the S is not burned to SO_2; and (2) that an excess of KI must be added as otherwise it is possible to find double the amt. of S which is actually present. C. A. COLE.

Mine Gases and a Simple Methane Apparatus. G. A. BURRELL. *Mining World*, 36, 10–2; *Chem. Eng.*, 15, 1–4.—Analyses of gases taken in different parts of mines and their effect upon the work of rescuing parties and canary birds carried with the parties are given. A simple app. for detn. of CH_4 within 10 min. to an accuracy of 0.1% is described. C. A. COLE.

Soot: Its Character and Composition. J. B. COHEN AND A. G. RUSTON. *J. Soc. Chem. Ind.*, 30, 1360–4.—Soot consists mainly of C, tar and ash or mineral matter, together with small quantities of S and N compds. and frequently possesses an acid character. It is a product of incomplete combustion and is formed partly by the mechanical removal of dust by the chimney draft and partly by the decomp. of the fuel such as occurs in the process of destructive distillation. Analyses of soot collected from various domestic and industrial chimneys are given showing the effect of strong draft, temp. and distance from furnace. C. A. C.

Relation of Rare Gases to Nitrogen in Fire Damp (MOUREAU, LE PAPE). 8.

U. S., 1,013,404, Jan. 2. H. KOPPERS. **Recovering ammonia from gases.**

U. S., 1,013,643, Jan. 2. A. R. CRUSE. **Safety device for gas holders.**

U. S., 1,013,988, Jan. 9. G. M. CONWAY. **Utilizing spent bark or similar material as fuel.**

U. S., 1,014,385, Jan. 9. C. M. GARLAND. **Gas producer.**

U. S., 1,014,522, Jan. 9. C. RORABECK. **Gas producer.**

U. S., 1,014,654, Jan. 16. W. G. LAIRD. **Apparatus for making gas from coal, tar or other material whirled in a vertical retort.**

U. S., 1,014,943, Jan. 16. F. V. BRAY. **Separator for removing gas from oil or other liquids.**

U. S., 1,015,033, Jan. 16. W. W. LANGDON. **Making coal briquets.**

Ger., 230,083, May 4, 1909. FR. W. C. SCHNIEWIND. **Coke chamber with lateral gas outlets and a cover closing the chamber lengthwise.**

Ger., 230,130, Sept. 10, 1907. H. LIMBERG. **Charging coke ovens.**

Ger., 230,190, July 23, 1909. A. ANDRIESSEN. **Carburetted water-gas generator in which the volatilization of the carburetting means is effected in the shaft, the gaseous product being then fed into the white-hot layer of coal.**

Ger., 230,489, May 28, 1910. TÜBBEN. **Enriching and collecting combustible mine gases from the normally escaping current of mine damp in mines without change of the ventilation app.**

Ger., 230,584, Feb. 12, 1900. A. BLEICHERT & CO. **Quenching and transportation of coke.**

Ger., 231,219, Dec. 29, 1909. E. FOCHTENBERGER. **Fire kindler consisting of porous fireproof body for the liquid fuel.** The product has a hard but porous crust, whereby it is protected from bursting in the fire and rendered resistant to mechanical influences.

Ger., 231,285, Aug. 7, 1909. GEBR. KÖRTING AKT.-GES. **Gas purifier.** The gas is led through sieves (perforated Fe sheets) washed by warm water. The forward part of the purifier through which the gas passes first has a greater number of cross-

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partitions between which the current travels whereby a portion of the impurities is sepd. The remaining impurities are sepd. by 4 sieves on the rear end of the app.

Ger., 231,384, May 10, 1910. P. SCHÖNDELING. **Separation of slate from coal in the wet way.**

Ger., 231,393, Jan. 18, 1910. B. KISCIELSKI and BARON A. KRUEDENER-STRUVE. **In peat-working machines,** grinding or cutting the crude peat between a fixed slotted bottom-disk and a rotating grinding disk.

Ger., 231,498, May 4, 1909. F. SCHNIEWIND. **Coke oven** with laterally exchangeable gas feed pipes from which the gas is distributed through nozzles upon each heating wall.

22. PETROLEUM, ASPHALT COAL TAR AND WOOD PRODUCTS.

R. E. HUMPHREYS.

The Origin of Petroleum. V. IPAT'EV. Michail Artill. Acad. *J. Russ. Phys. Chem. Soc.*, 43, 1437–45.—For the origin of petroleum 2 hypotheses are current. The mineral hypothesis suggested itself by the fact that cast iron, when treated with dil. acids, yields a mixt. of gaseous, liquid and solid hydrocarbons resembling those found in petroleum. According to this hypothesis, petroleum originates below the layer of sedimentary rock through the action of H_2O on Fe carbides, and then rizes to the upper layers. This hypothesis, therefore, leads to the emanation hypothesis and perpetuity of petroleum wells. The other, more widely favored organic hypothesis, was suggested by the fact that the decomp. products obtained by heating oils and fats to high temps. greatly resemble the constituents of petroleum. The chief objection to the organic hypothesis is based upon the presence of large amts. of CO and H in the decomp. products of oils and fats, while the amt. of these gases in petroleum is insignificant. On the other hand, the mixt. of substances obtained by the action of dil. acids on cast iron is also far from being identical with petroleum, the former consisting chiefly of ethylenes. To show this, I. reinvestigated the action of dil. HCl on different varieties of com. Fe. While in all cases the gaseous products contained considerable amts. of satd. hydrocarbons, the liquid portion consisted almost exclusively of ethylenes with only a small admixture of the polymethylenes so prevalent in petroleum. But since the numerous investigations of I. showed that under high pressures, particularly in presence of catalyzers, even at not very high temps., both ethylenes and O-containing compds. (alcs.) yield a mixt. rich in satd. and polymethylene hydrocarbons, the objections to either of the above hypotheses, from a chem. point of view, lose their force, since the formation of petroleum may be assumed to have occurred under just such conditions. I., however, inclined to give preference to the organic hypothesis, because it is more in accord with the results of geological and biological investigations which show the destruction of living beings on an enormous scale in the neighborhood of sea shores and the formation of H_2S in the Black Sea through decay of animal matter. H. M. GORDIN.

The Various Theories of the Origin of Petroleum. C. L. BREGER. *Mining World*, 35, 1219–21, 1321–4.—Under origin from organic material comes origin from: (1) Coals, based on the fact that all coals contain hydrocarbons similar in nature to petroleums, and that kerosene-like oils have been distilled from coals. (2) Seaweeds. Marine algae, with or without shell-fish or woody remains, may be distilled to furnish petroleum and natural gas hydrocarbons. The same may be said of lake weeds, weeds of salt meadows, rivers, deltas and brackish-water embayments. Engler and Höfer produced petroleum from vegetable oils by distillation. The conjunction of animal remains with seaweeds may be admitted. There are 2 modifications of this theory,

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I, the flysch and II, the pelagic. According to I the deposits have been littoral; II the deposits have accumulated in vast oceanic eddies similar to the Sargasso Sea. (3) Animal origin. Fish, mollusks and radiates, upon their death, fall to the ocean bottom. Preserved from decay by salinity and coldness of the water, by absence of O and paucity of scavenger organisms, they are finally buried under sediments and afterwards distilled. Remains of fish are abundant in many asphaltic and oil-bearing beds. The optical activity of petroleums, due to the presence of N compds., is urged in favor of the animal as against the vegetable origin, though N is abundant in most seaweeds. Against the theory is urged the rapidity of decay of animal matter, and that most of it would be devoured by scavengers, large or microscopic. Of the 2, the vegetable theory is the stronger. R. E. Humphreys.

Fallacies in the Organic Origin Theory of Petroleums. II, III. Eugene Coste. *Mining Sci.*, 64, 515–7, 535–6.—The claim that bacterial action on organic matter is responsible for petroleum formation must be limited to the N portion, as such action will be arrested by the antiseptic action of the hydrocarbons formed. If bacterial action under H_2O could transform organic matter into petroleum, the coal beds should also have been acted upon. The anticlinal theory is untenable because, according to it, the shale beds are, at one and the same time, the porous, free-circulating sources of petroleum and the impervious covers and barriers to their circulation to the surface. Oil and gas fields are under enormous pressure. Therefore, all surrounding strata must be absolutely impervious, and must have existed so for ages. The anticlinal theory cannot explain gas pressure or its variations. The hydraulic theory is also untenable because many oil sands have no H_2O. Bituminous shales are found only as isolated, small patches along fissures, and the oil is a subsequent infiltration. Most of these shales are black because of contained coal rather than crude petroleum. Petroleum can be obtained by distilling these shales, but such distillation was not carried out in nature for want of the necessary heat. No real animal matter was entombed in the fossiliferous strata, having disappeared through decay. Petroleums are not, as a rule, associated with fossils. Such strata are universally devoid of oil. The mode of occurrence of petroleum in sedimentary strata of all ages but in certain districts only, and the const. recurrence of hydrocarbons in volcanic and igneous rocks and volcanic emanations, in metallic and other veins, in meteorites, in comets and other stellar bodies clearly demonstrates that petroleums are not of organic origin. In the same strata, petroleum is found only where there has been some tectonic structural disturbances. R. E. H.

Origin of Lander Oil and Western Phosphate. C. L. Breger. *Mining Eng. World*, 35, 631–3.—Some of the best evidence of the origin of petroleum in certain oil fields through the agency of microörganisms, is exhibited in and about the Lander oil field, Wyoming. B. describes in some detail the character of phosphate-oil beds, conditions of origin, and reservoirs of Lander oil field. The Lander has evidently been derived from the bitumen which everywhere abounds in a phosphate-bearing, black, shale horizon in the Carboniferous rocks of the west. The bitumen and the phosphate are of common origin. They were produced or developed in Carboniferous time in the sediments now containing them. Both are ascribed to a submarine ooze or slime of great extent. The ooze was of microörganic nature, probably composed largely of bacteria. These organisms extracted the $CaPO_4$ from sea-water and deposited it in the present phosphate beds and phosphatic shales. The slime itself, entombed in the sediments, has, by its slow distillation in the rocks, generated the petroleum.

J. H. Bower.

Transformer Oils. A. Berninger. *Mitt. k. k. Techn. Gewerbe-Museums Wein*, 21, 21–7 (1911); *J. Soc. Chem. Ind.*, 30, 696.—Oils for transformers should be pure

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petroleum oils, flashing above 100° and igniting above 200°. These should be completely free from acids, moisture, alkali and S compds. Their dielec. strength and elec. resistance should be detd. for different temps. between 15° and 100°. The resistance of an oil may be measured with the aid of a very sensitive mirror galvanometer at a const. tension of 440 v., care being taken to expel all traces of moisture by b. the oil before testing, since 0.06% of moisture depresses the result about 50%. The hot oil is placed in the testing vessel 10 min. before testing. An accurate measurement (expressed in megohms per cc.) may be made with the app. mentioned at a temp. as low as 28°; by prolonging the curve of a series of values for various temps., the value for 20° may be obtained. The difference between calc. and detd. values is at most 9%. The resistance varies considerably with the temp., especially between 0° and 30°. It is, therefore, important to det. the resistance at the normal working temp. of the transformer. For measuring the dielec. potential of oils at definit temps. a cylindrical glass vessel is used, resting upon a tripod of hard rubber. Two polished steel ball electrodes, 11 mm. in diameter, with thin stems are passed, one through the bottom of the vessel and the other through the hard rubber cover, being provided with a mm. scale to accurately adjust the distance between the electrodes. A thermometer with bulb at the level of the electrodes, and a stirring rod, to prevent the accumulation of particles of C between the electrodes, also pass through openings in the cover. The same quantity of oil previously heated to 105° is taken for each detn., and the electrodes are fixed at 5 mm. distance. The oil is stirred and the temp. taken and the tension of an a. c. of 44.5 periods, taken from an 8 kw. transformer for 100,000 v. (effective), gradually raised by regulation in the primary side until sparking is produced between the electrodes. The dielec. potential may be read upon a Grau's high tension voltmeter. The results show that the dielec. strength cannot be detd. from the elec. resistance but must be detd. at the working temp. as described. J. R. W.

The Nastiukov Reaction. E. Schmitz. *Mon. du pétrole roum.*, 1911, 25; through *Petroleum*, 7, 239.—The amt. of the ppt. which is formed in the Nastiukov reaction depends upon the temp., and upon the amt. of stirring. The bests results and greatest yields are obtained by keeping the temp. at 0°, and stirring the mixt. regularly. To the cooled mixt. of 50 cc. of oil and 25 cc. of HCHO, 50 cc. of H_2SO_4 (1.84) are added drop by drop in the course of 2 1/2 hrs. O. E. Bransky.

New Work in Mineral Oil Analysis and Mineral Oil Industry during 1910. Leopold Singer. *Chem. Rev. Fett-Harz-Ind.*, 18, 161–5, 190–5, 211–4, 249–57, 275–80, 293–9. —A condensed annual review. P. Escher.

Making Gasoline from Oil-well Gases. F. W. Brady. *Petroleum Rev.*, 25, 133–4, 173–4.—Description of machinery and methods. R. E. Humphreys.

Manufacturing Gasoline by a New Method. *Petroleum Rev.*, 25, 309–10.—Glycerol process without compression. R. E. H.

Apparatus for Filtration at a Constant Temperature. A. Eisenstein and F. Ziffer. *Chem. Tech. Ztg.*, 29, 181–2.—This app. is particularly adapted to the detn. of paraffin wax in crude oil and the quant. sepn. of paraffin wax from oil in paraffin scale. A Gooch funnel, so modified that the lower part just above the stem is narrower and shorter than the upper part, is connected by a rubber stopper with an ice jacket shaped like an inverted bell jar. The stem of the filter funnel extends into a filter flask through a rubber stopper. A Witte plate or piece of gauze, covered with a flat piece of filter paper, fits into the funnel just above the stem, and where this section of the funnel widens out to form the upper part a thermometer is inserted. A salt and ice mixt. is packed into the jacket, and when necessary, it is drained through the outlet at the bottom. In the detn. of paraffin, 5 to 10 g. of the heavy distillate or 1/2 to 1 g. of the paraffin scale are dissolved in 15 cc. of Et_2O. In the case of paraffin

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scale only the crystallized portions remain insol. The mixt. is poured into the upper part of the funnel, after having inserted the thermometer into the lower part. About 15 cc. of abs. EtOH are added, and the mixt. allowed to remain in the upper part of the funnel until the temp. of —20° is indicated and is maintained for some mins. The thermometer is then raised; the soln. flows into the lower part of the funnel upon the filter paper, and is drawn through with the aid of the suction pump. The sepd. wax is washed with 10 to 20 cc. of Et_2O-EtOH mixt., which is first cooled in the upper part of the funnel. When the wax has been sufficiently washed, the ice mixt. is removed, and warm water poured into the jacket. The wax is dissolved in C_6H_6 into a weighing flask; the C_6H_6 is evapd., and the wax weighed. The app. may also be used for higher temps. O. E. BRANSKY.

The Oil Shales of Scotland and their Distillation. ANON. *Petroleum Rev.*, **25**, 191–2, 229–30.—The retorts are vertical cylinders about 30 ft. high, 2 ft. diam. at the top and 3 ft. at the bottom, the upper third being of cast Fe, the remainder, fire brick. They are heated by the fixed gases derived from the distillation to 1200–1600° F. at the bottom and 900° F. at the top. The crushed shale is fed continuously into the top and drawn off at the bottom. The oil from the shale is driven off in its passage through the cast Fe portion, and the NH_3 from the lower part of the retort. These are drawn off from the top by exhausters through air condensers, and the condensate flows into a tank where the oil and NH_4OH are sepd. The gases go to NH_4OH scrubbers and thence to naphtha scrubbers, while the fixed gases are led to the retorts to be burned. The oil is refined according to usual methods. Full description of machinery and app. is given. R. E. HUMPHREYS.

Modern Diesel Oil Engins. F. SCHUBELER. *Petroleum Rev.*, **25**, 277–8, 307–8, 339–40. R. E. H.

Definition and Specifications of Petroleum Residues. A. GUISILIN. *Pétrole; Chem. Tech. Ztg.*, **29**, 187–9.—Liquid fuel represents all the residues of crude petroleum from which the naphtha, illuminating oils, and heavy oils have been distilled. The properties of the oil residues vary according to the method of distillation, and to the point at which the distillation of the heavy oils is discontinued. In the distillation of lubricating oils, the by-products are heavy oils with slight viscosity, and heavy residues of tars and asphalts. The purification of these 2 products yields a black oil, called "Astatki." This is the true type of liquid fuel, since it consists of such constituents as are unsuitable for any other use. In Russia, petroleum residues are classified thus: (1) Masut, a residue containing a large amt. of lubricating oils; (2) astatki, a mixt. of tar and heavy oils; (3) residue, the residue of crude oil from which only the lighter portions have been removed. The Intern. Comm. for the Study of Petroleum Derivs. have designated the following specifications for liquid fuel: d., flash pt., chill test, fluidity or viscosity, water, mechanical impurities, calorific value, and S.
O. E. BRANSKY.

The Regeneration of the Waste Sulfuric Acid of the Refineries. ANON. *Petroleum Rev.*, **25**, 195.—The acid is mixed with 50% by vol. of H_2O, thereby sepg. 20–25% oil and some 35–40° Bé. H_2SO_4 and then conc. to 60° Bé. in Pb pans. From the last pan it runs into a distillation retort, the lower part of which is of cast Fe, the upper of volvic lava, and is then heated to 300° to destroy the organic matter. Decoloration takes place. A current of air is pumped through the hot acid; the 30° Bé. acid vaporizes, and clear, conc. acid passes out of the retort. The air carries away large vols. of CO_2 and traces of H_2SO_4. The vols. of incoming and outgoing acids must be equal so that the conc. of acid in the retort should not change. The process is quite satisfactory. R. E. HUMPHREYS.

Investigation of Black, Regenerated Sulfuric Acid. J. HAUSMAN. Lemberg.

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Petroleum, 6, 2301–3.—In the refining of petroleum in the provinces of Campani with ordinary conc. H_2SO_4 and regenerated acid of the same strength in order to get a good soda test in the oil treated with the regenerated acid, an amt. of NaOH much in excess of the theoretical must be used. A weighed amt. of black acid was dild. with 10–15 times as much H_2O, and the asphaltic matter filtered off. One portion of the filtered acid was titrated against *N* alkali, and another portion treated with $Ba(OH)_2$ until weakly alk. By titration, the free H_2SO_4 and sulfo acids were detd.; the treatment with $Ba(OH)_2$ gave the amt. of H_2SO_4 and sulfates. In the latter case, the sulfo acids remain in soln. as Ba salts. After filtering off the $BaSO_4$, the filtrate is conc. and the excess $Ba(OH)_2$ pptd. as $BaCO_3$ by conducting CO_2 through the soln. The filtrate is evapd. to dryness, dried at 100°, and weighed. The mol. wt. of these salts was detd. by dissolving them in H_2O, pptg. the Ba as $BaCO_3$, igniting, and weighing as BaO. The amt. of metallic Ba was then calc. from the porportion: g. Ba salts of the sulfo acids/g. Ba = mol. wt./at. wt. Ba. The mean mol. wt. of the sulfo acids is 158, and if monobasic 79. A regenerated acid, sp. gr. 1.846, gave on analysis: H_2SO_4 (volumetrically), 95.5%; (gravimetrically), 94.64%; sulfo acids, based upon the mol. wt., 158, 2.1%; sulfates, 1.24%; asphalt, 0.82%. A sludge acid, twice dild., then conc., gave: H_2SO_4 (vol.), 97.49%; (grav.), 95.82%; sulfo acids, 2.5%; sulfates, 0.83%; asphalt, 1.85%. The poor soda test is explained by the presence of an acid weaker than the naphthenic acids; these acids, carried into the oil by the black acid, do not react with the phenolph. Oil treated with H_2SO_4, in which sulfo acids from a sludge acid were dissolved, gave a poor soda test. Oil treated with pure conc. H_2SO_4, and with mixts. of pure H_2SO_4 and asphalt obtained from regenerated acid, and with a mixt. of H_2SO_4 and toluene sulfo acids, gave good soda tests. The Na salts of these sulfo acids yielded no phenols by fusion with KOH. The mol. wt. corresponds to $C_6H_5SO_3H$, but no trace of this acid could be found. O. E. BRANSKY.

The Petroleum Refining Industry in America. DURAND. *Petroleum Rev.*, 25, 323–4. R. E. HUMPHREYS.

The Canadian Petroleum Industry. *Petroleum Rev.*, 25, 310–1, 337–8.—Details of developments. R. E. H.

Petroleum in Algiers. DUNIKOWSKI. *Chem. Tech. Ztg.*, 29, 113–4.—The properties of the Algerian oil is also very similar to those of Galician oil. Heavy oils, rich in lubricating oils, are found in the upper strata as is the case at Boryslaw; lighter and more valuable oils occur in the deeper formations. O. E. BRANSKY.

The Oil Fields of New Zealand. ANON. *Petroleum Rev.*, 25, 181.—The crude contains 15% naphtha b. below 150°, 42% kerosene distilling 150–300°, 20% lubricants, 13% paraffin and 5% coke. R. E. HUMPHREYS.

The Petroleum Districts in China. ANON. *Petroleum Rev.*, 25, 393.—Several fields that give promise of great production are known. The crude oil is of various colors. The best is nearly water-white. Yellow and greenish oils are used for illumination, while the black, viscous oils are used as lubricants without refining. R. E. H.

The New Oil Field at Carlyle, Illinois. H. A. WHEELER. *Petroleum Rev.*, 25, 214; cf. *C. A.*, 5, 3339.—The crude is high-grade, dark, and non-S-bearing. Sp. gr., 37° Bé. R. E. H.

The Petroleum Deposits of Roumania. L. MRAZEC. *Chem. Tech. Ztg.*, 27, 207–9; cf. *C. A.*, 6, 151.—In the classification of petroleum deposits, the petroleum found in regions of shearing and Diapar folds possess a higher content of unsatd. hydrocarbons than the oil occurring in regions which have been but slightly disturbed. Edeleanu and Gane have shown that the av. comp. of the oils found in different deposits changes

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according to the positions of the latter in the series of geological periods. The petroleum of the Eocene period is poor in paraffin. The oils of the Oligocene of Moldau are poor in paraffin, while the oils of the Oligocene of Bustenari are entirely free from paraffin. The oils from the salt formations are very light and free from paraffin. The comp. of the lower Pliocene oils is variable, but resembles that of the oils of the salt-bearing Miocene. The oils of the upper Pliocene are, in general, heavy and free from paraffin. O. E. BRANSKY.

New Method for Determining the Melting Point of Pitch. H. F. FRENCH. *J. Ind. Eng. Chem.*, 3, 907–10.—The method consists in electrically heating the pulverized material in a rotating bath of dil. H_2SO_4 until it coagulates, the temp. at which this occurs being taken as the m. p. The method is applicable to hard pitches and is accurate to within 1°. A. J. PHILLIPS.

The Antiseptic Effect of Creosote Oil and other Oils Used for Preserving Timber. J. M. WEISS. *J. Soc. Chem. Ind.*, 30, 1348–53.—Description of a series of tests made to det. the comparative antiseptic value of a number of oils used for the preservation of timber. Three classes of oils were used: (1) Oils prepared in the lab.; (2) pure substances occurring in these oils; and (3) com. creosoting oils. The effect of these oils was studied on 3 organisms: (1) *B. subtilus;* (2) *Saccharomyces glutinis;* (3) a *Penicillium*. The strongest antiseptics were found to be neutral oils of creosote; high b. bases of coal tar; coal tar acids, their efficiency rizing with the b. p.; coal tar creosote. Paraffin has no antiseptic qualities. Discussion is given concerning the antiseptic value of naphthalene. C. N. WILEY.

Distillation of Methyl Alcohol. G. BIRSTEIN, H. DENNELER AND A. HEIDUSCHKA. *Z. angew. Chem.*, 24, 2429–30.—Oxidation of MeOH to CH_2O by distillation in an oxidizing atm. demands that the temp. and pressure be regulated within narrow limits. The authors find that vapor phases sufficiently rich in MeOH for CH_2O prep. may be obtained by distilling MeOH-H_2O mixts. at 690 mm. pressure (slight vacuum). A soln. containing 47.4% MeOH distilled at 67–80°, the vapor containing 81.36% MeOH. The b. p. may be controlled by the conc. of the soln. and should not exceed 80°, otherwise oxidation proceeds too far. Distillation at 50° and 700 mm. is usually employed in practice since under these conditions the % of MeOH in the vapor is always but slightly higher than in the soln.; therefore, a practically const. b. p. may be maintained and there is no great change in the comp. of the soln. V. NUNEZ.

Acetone. J. JEDLICKA. Mitrovice. *Chemické Listy*, 5, 204–8; cf. *C. A.*, 5, 2078.—A description of the Austrian and English products. P. J. HANZLIK.

Oil Fuel for Steam Boilers (COLLINS). 21. Naphthalene in Road Tars (HUBBARD, DRAPER). 20.

U. S., 1,013,283, Jan. 2. F. H. DUNHAM. **Obtaining asphaltic cement and lighter products from asphaltic oils.**

U. S., 1,013,538, Jan. 2. C. ELLIS. **Floor-oil mixture.**

U. S., 1,014,103, Jan. 9. R. WALLBAUM. **Making emulsions of asphalt, pitch, paraffin, Japan wax, etc.**

U. S., 1,014,520, Jan. 9. C. I. ROBINSON. **Utilizing acid sludge from refining petroleum.**

Ger., 231,408, July 23, 1910. C. OTTO & Co. **Separating tar from hot distillation gases** by means of tar or tarry waste liquids.

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23. CELLULOSE AND PAPER.

A. D. LITTLE.

Cellulose and Dilute Solutions of Salts. B. RASSOW. *Z. angew. Chem.*, 24, 1127; *J. Soc. Chem. Ind.*, 30, 1307.—Cotton cellulose is capable of absorbing and fixing small quantities of metal from dil. solns. of Cu, Ni, Al, and K salts. The absorption is independent of temp., time of contact, or conc. of soln. The absorbed metal cannot be washed out. Unbleached cotton has greater absorbing power than bleached cotton; carefully purified cellulose absorbs very slightly, probably due to traces of oxycellulose; hydrocellulose does not absorb; artificial silks have a much higher absorbing power than cotton. The above phenomenon is suggested as a valuable test to distinguish between different kinds of cellulose. V. NUNEZ.

Analysis of Celluloid. C. RIVIÈRE AND L. CLÉMENT. *Caoutchouc and gutta-percha*, 8, 4691–5, 4777–8, 4858–61, 4949–50.—For the detn. of nitrocellulose in celluloid the following methods are recommended: (1) Detn. of the N content in the Lunge nitrometer; (2) distilling off the camphor with steam and weighing the residue; (3) extraction of the camphor with benzine. Two methods are proposed for camphor: (1) Decomp. of the celluloid by soda, distillation of the camphor with steam and polarimetric detn. of the camphor; (2) sepn. of camphor from nitrocellulose by taking advantage of the additional compd. which it forms with $(AcO)_2Hg$. A great variety of organic compds. have been suggested as substitutes for camphor. These may be detected and detd. by well known methods. Various compds., either inorganic compds. in EtOH soln. or certain albuminoids, may be added to render the celluloid less inflammable. A number of these are mentioned. Tests of the decomp. point of celluloid and tests of strength, elasticity, etc., are sometimes necessary. V. NUNEZ.

The Viscosity of Cellulose Solutions. H. OST. *Z. angew. Chem.*, 24, 1892–6; *J. Soc. Chem. Ind.*, 30, 1247–8.—Solns. of chemically modified cellulose give solns. of lower viscosity than normal cellulose. O. seeks to det. the degree of modification by a method based on this fact. Cuprammonium solns. of uniform strength were tested in a specially designed viscosimeter. The viscosity of lightly bleached cotton cellulose soln. was around 30, while prolonged treatment with conc. alkali gave a product of much lower viscosity. Solns. of high viscosity degrade on standing, probably due to oxidation or evapn. of NH_3, but 2% solns. decrease very slowly in viscosity. V. NUNEZ.

Testing of Imitation Parchment Papers for Resistance to Grease. G. SCHACHT. *Wochbl. Papierfabr.*, 42, 3632–4; through *J. Soc. Chem. Ind.*, 30, 1206.—Two methods are employed: (*a*) The paper should show blisters when held over a burning match; (*b*) oil of turpentine should not penetrate the paper sufficiently to mark a sheet of white paper underneath. (*a*) is not always conclusive and should be used only as a supplement to (*b*). V. NUNEZ.

The Bleaching of Wood Pulp. R. W. SINDALL AND W. BACON. *World's Paper Trade Rev.*, 56, 1073–4.—Some notes on the tintometer. V. NUNEZ.

Bleaching Powder versus Electrolytic Bleach. R. LEHMANN. Haynau. *Wochbl. Papierfabr.*, 42, 4563–8.—L. strongly favors electrolytic bleach wherever power is reasonably cheap. Comparative cost data is given. V. NUNEZ.

U. S., 1,013,529, Jan. 2. J. M. BURBY. **Apparatus for removing impurities from pulped waste papers.**

U. S., 1,014,635, Jan. 16. H. BROWN. **Device for watermarking paper.**

U. S., 1,015,155, Jan. 16. A. EICHENGRÜN. **Making solutions of cellulose acetates.**

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U. S., 1,015,156, Jan. 16. *Idem.* **Making solid celluloid-like masses from cellulose acetates.**

Ger., 230,905, Sept. 29, 1909. F. R. SCHNEIDER. App. for **purifying waste liquor in paper and wood pulp kilns,** comprizing a cone-like reservoir for ppts. with central feed.

Ger., 231,256, Mar. 26, 1909. Addition to 217,257. FR. CURTINS & CO. In the manuf. of an **adhesive for paper,** adding $NaHSO_4$ to the sulfates of Al and Mg.

Ger., 231,643, June 14, 1910. L. LILIENFELD. **In the coating or printing** of suitable layers **with viscose,** alone or mixed with colors or pigments, the known combinations of viscose are combined with metals of the Mg group (such as Zn) and alk. soln. sufficient to supplement said metal present. Soaps insol. in H_2O or sulfo-oleic acids or sulfo-fatty acids or their Na or NH_4 salts are added in amt. not less than 0.20 of the contents of cellulose. calc. on air-dried cellulose. These sheets are then ready for application. The viscose may be worked up with suitable pigments.

24. EXPLOSIVES.

C. E. MUNROE.

The Manufacture of Rifle Cartridges. W. HEAP. *Metal Ind.*, 10, 1-4.—A description of the English practice in the production of metal cartridge shells, the primer, the cap, the bullets, the powders and the loading of the shells. E. J. C.

External Tamping of Drill Holes to Prevent Explosions. VICTOR WATTEYNE AND EMMANUEL LEMAIRE. Serv. accid. min. et du grisou, siège d'expér. Frameries. *Ann. min. belg.*, 26; through *Rass. min.*, 35, 257-8.—By completely covering the orifice of the drill hole with an incombustible powder (crushed schist, pulverized chalk, sand), at the moment of explosion a dense cloud of this powder is formed which, mixing intimately with the hot gases, lowers their temp. The amt. of this powder necessary can be calc. from the formula $P = Q/600\,C$, where P is the weight of powder necessary, C its sp. heat and Q the amt. of heat necessary to raise the products of explosion to 600°. Expts. showed that an external tamp of 3 kg. prevents the ignition of coal dust by a charge of 700 g. of dynamite No. 1 and 4 kg. was sufficient for a charge of 910 g. of Favier explosive No. 1 extra. Fire damp is not ignited when 2 kg. powder are used with a 400 g. charge of dynamite No. 1. The powder must contain no carbonaceous matter; expts. with boiler ashes, containing some carbon, proved failures.
CHAS. A. ROUILLER.

Safety Explosives Used in Mines. J. TAFFANEL. *Chem. Ztg.*, 34, 1290.—The expts. were carried out with a series of French safety explosives with and without the addition of coal dust, partly in mines and partly in a steel experimental cannon. The wrapper was found to be very significant in the safety of the explosive. The main problem in the prep. of improved explosives for mines is to reduce the formation of CO to as low a value as possible on account of its danger to miners.
E. J. WITZEMANN.

Report of Royal Austrian Inspectors. 18. Uses of Explosives in Agriculture (GUNSOLUS). 15.

U. S., 1,015,214, Jan. 16. E. SOKOLOWSKI. **Bursting charge for shells,** comprizing densified trinitrotoluene and plastic trinitrotoluene.

U. S., 1,015,215, Jan. 16. *Idem.* **Projectil loading,** comprizing a scattering charge embedded in pressed plastic trinitrotoluene.

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25. DYES AND TEXTIL CHEMISTRY.

L. A. OLNEY.

A New System of Increasing the Humidity in Working Rooms of the Textil Industry. F. LUHR. *Gesundh. Ing.*, 34, 915–7.—The apps. for increasing the humidity of to-day are efficient but costly. L. describes a system in which the moisture is supplied by water vapor. ARTHUR LEDERER.

The Manufacture of Doll Hair. UEBERSCHLAG. *Färber-Ztg.*, 22, 377–8.—The wool of the angora goat (mohair) is most suitable for this purpose but often hard and lustrous sheep's wool is mixed with it. The mohair and the wool must be dyed separately as the wool has a much greater affinity for color and would be dyed a much deeper shade. Dyestuffs that dye on a chrome or alum mordant are used for coloring. For a bright blonde fast mordant yellow and Alizarin orange W dyed with metachrome mordant is used. A. S. HALLAND.

Protective Treatment for Charged Silk. O. MEISTER. *Z. angew. Chem.*, 24, 2391–5; cf. *C. A.*, 5, 3733.—A discussion of the efficiency of Rh salt in preventing the formation of "red spots." SIDNEY BORN.

Manufacture of a Fatty Reserve on Silk, with Suppression of Toluene and Benzene. J. DEPIERRE. *Bull. soc. ind. Mülhouse*, 81, 205–6.—The process is the customary one except that CCl_4 is used in place of other solvents. MILES R. MOFFATT.

Dyeing of Mixed Goods. WINTER. *Färber-Ztg.*, 20, 420–4. A. S. HALLAND.

Manufacture of Black Crepon on Cotton Tissue. E. JUSTIN-MUELLER. *Bull. soc. ind. Mülhouse*, 81, 203–5.—When conc. NaOH is printed on cotton dyed black with a color fast to NaOH, the black becomes more intense on the printed portions. To avoid this inconvenience, J.-M. tops the black with basic colors, which are subsequently destroyed where the NaOH is printed on. Thus an even black is obtained. Printing formulas are given. MILES R. MOFFATT.

Dyeing of Artificial Silks. WOLFGANG. *Färber-Ztg.*, 22, 406–7.—The different kinds of artificial silks require no washing, bleaching or mordanting previous to dyeing. Their affinity for basic colors is so pronounced that no mordanting with Sb tannate is necessary. Dyeing with substantive colors is done similarly to cotton dyeing. From 2 to 10% Glauber salt and 0.5 to 1% soda is added. The dyeing must not be done boiling hot nor the goods wrung in wet condition. A. S. HALLAND.

The Affinity of Aromatic Paradiamines for Fibers. JAR. FRANEK. State Ind. School, Prague. *Chemické Listy*, 5, 286–90.—A number of dyes and colors which are produced on cloth are described. P. J. HANZLIK.

Dyes. W. OSTWALD. *Chem. Ztg.*, 35, 1217–8.—The basis of the pastels used by artists is usually chalk, sometimes artificial $BaSO_4$, more rarely ZnO, or white lead. Chalk is the cheapest and is not poisonous like Zn or Pb. As a binder, starch, tragacanth, glue, and dextrin may be used. A 0.5% soln. of starch is very convenient and if a few drops of 10% soln. of β-naphthol in alc. be added, the soln. will keep for a long while. SIDNEY BORN.

Madder Lake, Alizarin Lake and their Modern Substitution. C. MAYER. *Chem. Ztg.*, 35, 1353–4.—A review. S. B.

Application of Photochemistry to Dyeing and Printing. F. ERBAN. *Chem. Ztg.*, 35, 1253–4.—A review. S. B.

Discharging Reserve White on Azo Base under Vat Dyes. V. KIELBASINSKII AND V. SLOSARSKII. *Chem. Ztg.*, 35, 1282–3.—To get a blue on an azo base, as α-naphthylaminebordeaux or para-red, one adds to the vat dye sufficient sulfoxylate not only

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to reduce the vat dye but also to discharge the azo base. After printing, the stuff is steamed for 3–5 min. and washed as usual. To get a white which will discharge the blue as well as the azo base, one treats the stuff with "Rongalit C L" of the Badische Anilin- & Soda-Fabrik, dries, steams 3 min., and washes in hot water or weak silicate soln. The same result is obtained by printing with sulfoxylate and "Rongalit C L" on an azo base, drying and printing over with discharging vat dye blue, steaming 3 min., washing and after the leuco base is reoxidized soaping at 50–60°. SIDNEY BORN.

New Method of Printing Sulfur Colors. C. FAVRE. *Bull. soc. ind. Mülhouse*, 81, 207–8.—This sealed letter, dated March 9, 1907, describes the printing with S colors which, while not attacking the Cu rolls, do not require the presence of caustic alkali. The action of the alk. sulfides on the rolls is restrained by the addition of HCHO, and the S colors are kept in reduced state by the addition of glucose. Formulas are given. MILES R. MOFFATT.

New Reactions of Aromatic Aldehydes. A. CONZETTI. Basel. *Chem. Ztg.*, 34, 1099.—The O. Fischer condensation of 1 mol. aromatic aldehyde with 2 mols. aromatic amine to leuco compds. of triphenylmethane proceeds in 2 stages: (1) Formation of a hydrol from 1 mol. each of aldehyde and amine; (2) union of the hydrol with a 2nd mol. of amine. (2) proceeds more slowly as the conc. of H_2SO_4 increases and above 70% conc. stops entirely. However, aromatic hydrocarbons only react with the hydrol in conc. H_2SO_4; this reaction may be carried out simultaneously with the 1st above; 1 mol. *p*-alkylaminobenzaldehyde, 1 mol. aromatic amine and 1 mol. aromatic hydrocarbon or its derivs. unite without auxochrome groups to form diamidotriarylmethane compds. These leuco compds. are green to blue-green dyes. The constitution of the products are discussed but has not been definitly detd. E. J. WITZEMANN.

Colloidal Reactions and their Application to Dyeing Wood. M. DE KEGHEL. *Rev. gén. chim.*, 14, 329–33, 348–55.—In dyeing wood the interior must be colored, while in the case of fibers the dye is generally pptd. on the fiber. Accordingly the granules composing the dye soln. must be small enough to traverse the capillary channels of the wood. Since different dyes travel through capillary tubes at different velocities, the mixts. of different dyes necessary to produce a certain shade cannot be used as in cotton dyeing. Capillary action would in places sep. the components of the mixt. and produce uneven results. This difficulty is obviated by mixing unstable colloids of opposit sign in such proportions that the ppt. first formed is dissolved in the excess of one colloid. The resulting complex is homogeneous and possesses the essential properties of the sep. dyes. Thus, to produce a brown, 18 cc. of a 1% soln. of benzo blue are pptd. by 14 cc. of a 1% soln. of fast orange, and the ppt. is sol. in 8 cc. excess of benzo blue. The steps in the actual process are: (1) Displacement of the sap and mordanting with soap, (2) injection of dye, (3) fixation of dye. The first operation requires a 3% soln. of soap containing also 1.6% of Solvay soda. This soln. is injected into the wood under pressure and for a time varying with the length and nature of the wood. The dye solns. are also injected under pressures varying between 20 and 75 kg. during periods of 1–8.5 hrs. Fixation consists in submitting the wood to the action of live steam at 800 g. for 4 hrs. in case the logs are 0.5 m. in diameter. As a result the − soap colloid ppts. the + dye colloid. Finally the log is cut into thin boards which are carefully dried. A drawing of the injection app. and a table of the consts. of injection for varying lengths of different woods are given. MILES R. MOFFATT.

The Science and Technic in the Chemical Industries with Special Consideration of the Coal-tar Dye Industry. C. DUISBERG. *Z. angew. Chem.*, 25, 3–14. E. J. C.

The Present Position of Indigo. ANON. *Chem. Trade J.*, 50, 3–4. E. J. C.

Theory of Dyeing: The Color and Molecular State of Picric Acid. WILLIAM

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PORTER DREAPER. *J. Chem. Soc.*, 99, 2094–101; *Proc. Chem. Soc.*, 27, 244.—Anhydrous picric acid is probably colorless; in presence of H_2O it is yellow and possibly quinoidal. In the case of cotton, although the change to the colorless type takes place readily in the presence of dehydrating agents, yet the presence of toluene will not bring about this change, in spite of the fact that picric acid has little affinity for vegetable fibers, in presence of H_2O; also, under certain conditions, picric acid in the yellow state is adsorbed by cotton from a colorless toluene soln. Theoretical consequences are deduced from these results. J. BISHOP TINGLE.

Methyl-1,2,benzanthraquinone Series (SCHOLL, TRITSCH). 10.

U. S., 1,014,039, Jan. 9. M. BÖNIGER. **Dark blue monoazo dyes** made by combining monobromonaphthalene-1-diazo-2-oxide-4-sulfonic acid with naphthol compds.

U. S., 1,014,114, Jan. 9. *Idem.* **Red monoazo dye made** by combining monobromonaphthalene-1-diazo-2-oxide-4-sulfonic acid with a 1-aryl-3-methyl-5-pyrazolone.

U. S., 1,014,204, Jan. 9. W. BERCHELMANN. **Blue dye** obtainable from 1,4-diaminoanthraquinone and ethylene oxide.

U. S., 1,014,243, Jan. 9. R. B. MILLS. **Dyeing apparatus.**

U. S., 1,014,539, Jan. 9. E. ULRICHS. **Making lakes** from the dye produced from diazotized α-naphthylamine and naphtholsulfo acid—1:4.

U. S., 1,014,633, Jan. 16. W. BERGDOLT. **Azo dye,** obtainable from *p*-aminoacetanilide, 2,5,7-aminonaphtholsulfonic acid and phenol, dyeing cotton blue.

U. S., 1,014,982, Jan. 16. J. TURNER and H. DEAN. **Dye,** obtained by combining diazochlorobenzene, aminonaphtholdisulfonic acid (1,8,3,6), tetraazotized benzidine and chloro-*m*-phenylenediamine-1,2,4.

U. S., 1,014,983, Jan. 16. *Idem.* **Making a dye** by a process similar to that of the preceding patent.

U. S., 1,014,984, Jan. 16. *Idem.* **Making a dye** by rediazotization of a *p*-aminoazo compd. and aminonaphtholsulfonic acid and combination with chloro-*m*-phenylenediamine.

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26. PIGMENTS, RESINS, VARNISHES AND INDIA RUBBER.

A. H. SABIN, D. SPENCE.

U. S., 1,013,544, Jan. 2. W. G. FUERTH. **Ink for stencil duplicating.**

U. S., 1,014,211, Jan. 9. G. DOSSELMAN and P. NEYMANN. **Paint and varnish remover.**

U. S., 1,014,397, Jan. 9. A. JONES. **Machine for making inlaid linoleum.**

U. S., 1,014,411, Jan. 9. D. J. OGILVY. **Recovering the resinous products from rosin waste.**

U. S., 1,014,689, Jan. 16. F. BELLET. **Furnace for making ultramarine blues.**

U. S., 1,014,752, Jan. 16. C. ELLIS. **Removing paint or varnish** by an aq. soln. containing chloral hydrate.

U. S., 1,014,842, Jan. 16. A. M. MUCKENFUSS. **Method of and apparatus for testing paint.**

U. S., 1,015,008, Jan. 16. H. W. DE PREZ. **Apparatus for fuming wood.**

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27. FATS, FATTY OILS AND SOAPS.

E. SCHERUBEL.

Practical Application of Fluorescence in Testing Oils for Industrial Purposes. A. F. OUTERBRIDGE. *J. Frank. Inst.*, 172, 591–9.—O. detects the adulteration of vegetable oils with mineral oils by observing their appearance when viewed under the rays of an enclosed arc. Mineral oil shows a green and resin oil a blue fluorescence; vegetable oils show none. By preparing standards the amt. of adulteration can be detd. The method is not intended to supplant chem. analysis but to afford a means of rapidly detg. whether a vegetable or animal oil is adulterated. The fluorescent test for kerosene adulterant is not sensitive enough to be of value for kerosene will not tinge other oils to which it is added in small amts. E. SCHERUBEL.

Sea Elephant Oil. J. LUND. *Seifensieder Ztg.*, 38, 1392–3.—The consts. of this oil are as follows: d_{15} 0.9222, sapon. no. 190, I no. 124, Hehner no. 95.0. The fatty acids show d_{15} 0.8981, neut. no. 197, I no. 132.5, mean mol. wt. 284. This oil finds use in the soap and leather industries and also as a burning oil. E. SCHERUBEL.

Index of Refraction of Mixed Acids of Fatty Oils. W. B. SMITH. *J. Ind. Eng. Chem.* 4, 36–8.—S. found that the values 1.4981, 1.422 and 1.441 for the n at 60° of the insol. acids of rape oil, cocao butter and olive oil, resp., are not correct. The relation between the n of the oil and n of the acids depends upon the % of acid in the glycerides, being nearly independent of the total n and of the I. no. The n of the insol. acids of fatty oils should be close to n of the oil × 0.9938. For solid fats this factor should lie between 0.992 and 0.994, according to the comp. of the fat. E. S.

Detection of Sesame Oil in Mixtures. UTZ. Chem. Div. Hyg.-Chem. Station, Munich. *Chem. Rev. Fett-Harz Ind.*, 18, 292–3.—Utz re-examd. Guarneri's test for sesame oil in which a few drops of an ether soln. of H_2O_2 is added to the oil together with twice the oil vol. of 1.4 HNO_3 with shaking; a blue color is said to show the presence of sesame oil. U. finds that the reaction is not as sensitive as Baudouin's with $SnCl_2$ and that the color (U. could only obtain a green coloration instead of blue) is not sharply defined; he does not recommend Guarneri's test. P. ESCHER.

A Chemical Study of the Oils Extracted from the Fruits of Different varieties of Palms. A. HÉBERT. *Bull. soc. chim.*, 9, 1083–5.—Six samples of fruits from different varieties of *Elaeis nigrescens* and 2 from different varieties of *Elaeis virescens* coming from French E. Africa were examd. The yield in oil per 100 parts of pulp ranged from 41 to 63 parts, the varieties *sempernigra*, *communis* and *vulgaris* (species *nigrescens*) which contain the largest amt. of pit, yielding the lesser quantity, while the variety *pisifera* (species *nigrescens*), with small pits, gave the most oil. The physical consts. of the various oils were practically identical. Consts. are given. All the oils could be used as food except that from the variety *repanda* (species *virescens*), which probably contains a toxic principle, for it is said to cause headache, nausea and even giddiness. WALTER REGNAULT.

Detection of Carbon Disulfide in Oils. E. MILLIAN. *Compt. rend.*, 153, 1021–3.—Neither the use of the oleorefractometer nor the method of Cussom (based on the transformation of CS_2 into xanthine) are reliable tests; but the $Pb(OAc)_2$ test and the oil of capoc test are both delicate and reliable. For the $Pb(OAc)_2$ test 25 g. of oil to be treated are saponified cold with KOH, the soap dissolved in 150 cc. H_2O. decomp. with HCl and covered with paper moistened with a soln. of $Pb(OAc)_2$. If the oil contains 1 pt. in 1000 of CS_2 the $Pb(OAc)_2$ paper shows a black stain due to H_2S. The blackening is very intense with 2 pts. in 1000 and can be detected with as little as 0.5 pt. per 1000. For the oil of capoc test 50 g. of the oil to be tested are mixed with 10 cc. amyl alc. and distilled until 5 cc. pass over. 4 cc. of this distillate are mixed with

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1 cc. oil of capoc and a few cm. powdered S and heated in a sealed tube at temp. of b. water. With oils free from CS_2 the mixt. remains colorless, but as little as 1 pt. per 1000 CS_2 causes a distinct coloration. It is best to use an oil of capoc made neutral by washing with NaOH. Cottonseed oil may be used instead of oil of capoc, but the reaction is not so delicate. The test may also be applied without distillation by heating 1 vol. neutral capoc oil, 5 vols. amyl alc. satd. with S and 4 vols. of the oil to be tested in a sealed tube to the temp. of b. water, but this method is not so delicate as the distillation process. If the suspected oil is heated for 1 hr. to 130° neither process shows the presence of CS_2. PERCY H. WALKER.

Modification of the Ethyl Ester Method for the Detection of Coconut Oil in Butter. J. HANUS AND FERD. PETRIK. Boh. Tech. High School, Prague. *Chemické Listy*, 5, 365–8, 414–8.—The presence of 5% of coconut oil can be detd. by the Et ester no. The no. is not affected by benzoic and salicylic acids; triacetin and tributyrin will appear in the alc. distillate. In order to obtain all of the Et esters from 5 g. of fat a 1000 cc. distillate is necessary. P. J. HANZLIK.

Denaturing Fatty Oils. ANON. *Z. öffent. Chem.*, 17, 387–9.—The Imperial (German) Testing Station recommends discontinuing the use of oil of rosemary and of Ceylon oil of citronella for denaturizing fatty oils and recommends using turpentine, safrol, artificial oil of wintergreen, olein, nerolin II*a* (Yara Yara, β-naphthol methyl ether) for this purpose. PERCY H. WALKER.

Custom House Testing of Fatty Acids. *Z. öffent. Chem.*, 17, 389, 90.—The Imperial (German) Testing Station found Farnsteiner's method the most satisfactory in detg. the solid fatty acids in a sample examd. The material was saponified with 0.5 *N* alc. KOH, made neutral to phenolph. with AcOH, treated with 10% $Pb(OAc)_2$, the ppt. washed with hot H_2O, dried in H at 105°. The insol. Pb salts were 3 times crystallized from C_6H_6, decomp. with HCl and shaken out with ether, dried over $CaCl_2$, the ether evapd. in H and the solid fatty acid weighed. An I no. detn. showed that some liquid fatty acids were still present, which were calc. as a correction by detg. the I no. of the liquid fatty acids recovered from the C_6H_6 used in purifying the Pb salts. PERCY H. WALKER.

Culture of the Coconut Palm. H. ZAEPERNICK. *Beihefte zum Tropenpflanzer*, 1911, 509–611; through *J. Soc. Chem. Ind.*, 30, 1222.—Z. gives a detailed account of the cultivation of the coconut palm, including prep. of the soil and manuring; and also a chapter on the prep. of copra. E. J. C.

Synthesis of Fats by Enzymes (DUNLAP, GILBERT). 10. Report of Royal Austrian Inspectors. 18. Fat Determinations in Feedstuffs and Seeds (MONHAUPT). 12.

U. S., 1,014,457, Jan. 9. L. O. FOX and O. A. FOX. **Composition butter.**

Ger., 230,221, May 19, 1910. O. KUNZE. **Drying chamber for soap,** sepd. from the heating chamber by an extension partition with front capable of being turned down, the forward part of which on being turned up covers the front wall of the box.

Ger., 231,167, Dec. 18, 1908. J. A. KEYES. In a **soap mold and press** the cut pieces of soap are brought positively between the stamps where they are gripped by the projecting ejectors, the stamps themselves then releasing the grips in their further movement and pressing the piece of soap between them.

Ger., 231,460, Feb. 20, 1910. R. BETZER. In the manuf. of a **permanently plastic mass,** stearin 60 g. is melted by heating to 120°, glycerol 120 g. is added gradually with borax 300 g. and a few drops of citron oil, while stirring, forcing the product after cooling through a color mill to render it homogeneous, and storing.

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28. SUGAR, STARCH AND GUMS.

A. HUGH BRYAN.

Crystal Formulas, etc. J. V. LANGE. *Arch. Suikerind.*, 19, 1664–8.—L. calls attention to erroneous conclusions that may be drawn from the application of the customary formulas in comparing sugars, on the one hand, which have the crystals enveloped in a molasses coating of low purity, with those on the other hand, which have them enveloped with a molasses of high purity, and he suggests a mode of calculation to get more nearly comparable results. P. A. YODER.

Incrusting Coloring Matter of Sugar Cane. L. G. L. STEUERWALD. Expt. Sta. of the Java Sugar Ind. *Arch. Suikerind.*, 19, 1543–7.—The yellow coloring matter was extracted with NaOH soln., freed from gums by addition of alc., pptd. by acid and further purified by soln. in acid and repptn. with water. A product of constant comp. called *saccharetin*, $(C_4H_7O_2)_n$, was obtained in non-cryst., round granules. It has the properties of the "incrusting coloring matter" of Prinsen Geerligs (*Ibid.*, 1897, 359). It is a weak acid, gives the characteristic reactions of woody matter, and has properties similar to phlobaphene. It belongs to the aromatic series, yielding by dry distillation pyrogallol and by fusion with KOH, protocatechuic acid and pyrocatechol. It presumably bears a close genetic relation to tannin, phlobaphene, lignin, and possibly also glucosides. The cane juice contains apparently a related yellow coloring matter. The saccharetin is not removed from the juice through clarification, sulfitation, or carbonation. The dark color developed by saccharetin and its decomp. products with Fe salts may account for the darkening effect of very small quantities of these salts. 5.15% of it was found in bagasse. For light colored products it seems desirable to remove from the juice as fully as possible the fine particles of bagasse before rendering the juice alkaline. P. A. YODER.

Raffinose or the Products Formed by Overheating. A. VERMEHREN. *Deut. Zuckerind*, 36, 590–1.—Sucrose was detd. in a molasses, a raw sugar, and an after-product of ordinary inversion, inversion after pptn. with basic $Pb(OAc)_2$, and by Fehling's soln. The latter gave much higher figures (1–4%) than the former. It was suspected that raffinose was reducing some of the Cu, and sucrose and raffinose were calc. from the Cu ppt. by the formulas $Z = (582.98\ Cu - P.F)/(0.9491\ F' + 0.3266\ F'')$ and $R = 1.053\ P + 0.3442\ Z$ (meaning of letters not given.—ABSTR.]. These results checked closely with those from ordinary inversion. It is concluded that ordinary inversion gives the best figures for sucrose, though probably they are a little low, and that raffinose is probably not present. WALTER L. BADGER.

Sampling of Cane Juice. J. M. ENGELBREGT. *Arch. Suikerind.*, 19, 1672–3.—The samples collected by 2 samplers showed an av. difference of 0.06% in sugar or a difference in the polarization reading of 0.2. P. A. YODER.

Preliminary Report on the Determination of Sugar in Mill Bagasse. J. J. HASEWINKEL, J. S. DE HAAN AND G. L. VAN WELIE. Expt. Sta. for the Java Sugar Ind. *Arch. Suikerind.*, 19, 1687–91.—Samples of the bagasse are taken at the mill continually for 15 min. each hr. From this large sample a sub-sample of about 2 kg. is cut by means of a special machine into 1 mm. lengths and made to pass through a 4 mm sieve. Of this 20 g. is boiled with 250 cc. water for 15 min. in a tin cup with vigorous stirring at the beginning of the b. to prevent the formation of lumps. During this b. 50 cc. water is allowed to drip into the cup from a pipet (with a stopcock), and the b. is so regulated that at the end there remains about 250 cc. of water in the cup. The cup and contents are now cooled and 5 cc., or if 5 cc. is found insufficient, 10 cc. Pb subacetate soln. is added, the mixt. filtered and the filtrate polarized. The % sugar is calc. or is found by reference to tables used in the method now in vogue. If 15

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min. b. is found to yield less sugar than longer b., then the samples are boiled 30 min. instead. The addition of water during the b. is to prevent the soln. outside of the cells attaining a greater const. than that within. A fuller report will follow.

P. A. YODER.

Use of Dry Lead Subacetate in Sugar House Analysis. W. E. CROSS. *Louisiana Planter*, 48, 24.—Tables of comparative figures for direct polarization of cane juices using Schmitz' method with Pb subacetate soln. and Horne's method using Horne's dry lead for clarification, are given. One operator found an average of 12.64 with wet subacetate and 12.62 with dry subacetate. Other operators on different juice obtained 11.79 and 11.75 while a third obtained 10.7 and 10.7. Dry lead subacetate will, therefore, give practically identical figures with lead subacetate solution and is much simpler for juices. A. H. BRYAN.

Analysis of Sugars and Sugar Mixtures in the Central Laboratory of the Ministry of Finance. RENÉ VALLIER. *Rev. gén. chim.*, 14, 317–25.—A detailed description of the lab. equipment and the analytical methods employed in the analysis of chocolates, confectionery, preserves, molasses and sugars. P. B. DUNBAR.

Tables for Calculating the Recoverable Sugar and the Recoverable Crystal (in Raw Juice) and for Calculating the Crystal Content of Sugars of Different Composition. H. C. PRINSEN GEERLIGS. *Arch. Suikerind.*, 19, 1469–72.—These tables are based on the assumption that the standard sugar polarizes 96.5, has a crystal content of 95.1, that the molasses has a purity o 33.3, and that the ratio of sugars to non-sugars in the scums is 1 : 2. W. L. BADGER.

Precision in the Commercial Polarization of Crude Sugars. J. A. HALL. *Rev. ind. agr. Tucuman*, 2, 198–205. G. A. ROUSH.

Temperature Corrections in Raw Sugar Polarizations. W. D. HORNE. *J. Ind. Eng. Chem.*, 4, 41–2.—A comparatively cheap installation for polarizing at 20° is described and results of polarizations are given. Where polarizations are made at any other temp. than 20°, in calculating results to a polarization at 20°, H. contends "that if any such correction is to be applied, it should be done in accord with a full appreciation of the significance of levulose as well as of sucrose and thus be made as correct as our present knowledge will allow." A. H. BRYAN.

Analyses of Sugar Beets (1905-1910) together with Methods of Sugar Determination. A. HUGH BRYAN. Bur. Chem., U. S. Dept. Agr., *Bull.* 146.—The results of analysis of 1000 samples of beets are given; these are arranged under states and finally under counties. The methods of sampling and various methods of detg. the % of sugar in the beet are thoroughly discussed. A fairly complete bibliography of literature on methods of analyzing beets from 1839 to 1906 is also given. A. H. BRYAN.

Rayner Bagasse Drier. ANON. *Louisiana Planter*, 48, 12.—A description with cuts are given. The flue gases are used to dry the bagasse. 2.57 gals. of oil per ton of cane are saved when only 14.5% of the moisture is evapd. from wet bagasse. With greater drying, more oil is saved. A. H. BRYAN.

A Special Form of Raw Juice Settling Tank. J. E. WATERMAN. *Arch. Suikerind.*, 19, 1661–4.—Two forms are described which require less close attention from the relatively inefficient Javanese servants. P. A. YODER.

Extraction of Cane Juice. CARLOS R. HAMAKERS. *Rev. ind. agr. Tucuman*, 2, 158–68.—Discussion and comparison of the results obtained with 3 mills, and with a Krajewski crusher and 4 mills. G. A. ROUSH.

Is the Use of Temperatures, during Evaporation, Bordering on 130° Permissible, and Under what Circumstances? VON LIPPMAN. *Deut. Zuckerind.*, 36, 643.—Sugars apparently caramelized were obtained in some factories in the past campaign. They

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were yellow all through, could not be clarified, and gave solns. having a burned smell. They had been obtained from juices which had been heated to 130°, and had been held too long at that temp., due to faulty design of the app. There is no excuse for going above 120° at any time; though, because of the short time in the app., juices may be heated higher in the Kestner evaporators than would be otherwise permissible.
W. L. BADGER.

Hydrosulfites in the Sugar Factory. R. DUTILLOY. *Sucrerie belge*, 40, 184. —Notwithstanding the many attacks which have been made upon the use of hydrosulfites, it has been found as the result of some 6 yrs. of experience that when they are used with an alkalinity to litmus of 0.1–0.2 g. per 100 g. substance, filtration becomes at once much more ready, even of products of 37–38° Bé., when filtered at 95°, and these products did not later develop a color again. Care must be taken to have the alkalinity as low as possible, especially in CaO. A. GIVEN.

Varieties of Cane. R. E. BLOUIN. *Rev. ind. agr. Tucuman*, 2, 73–98, 101–15. —Descriptions and tables of comparative analyses of about 75 different varieties of cane for the years 1910 and 1911. G. A. ROUSH.

Approximate Estimation of Starch (REED). 7. Pentoses in Fermenting Mixtures (CROSS, TOLLENS). 16. Report of Royal Austrian Inspectors. 18.

U. S., 1,013,497, Jan. 2. F. A. V. KLOPFER. **Obtaining starch and gluten from wheat flour.**

U. S., 1,014,237, Jan. 9. S. M. LILLIE. **Composit starch-conversion product.**

U. S., 1,014,311, Jan. 9. *Idem.* **Apparatus for converting starch, by a continuous operation, into dextrin, etc.**

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29. LEATHER AND GLUE.

LLOYD BALDERSTON.

Unification of Methods of Tannin Analysis. EDOUARD ROY AND DE LA BRUÈRE. *Leather Trades Rev.*, 44, 877–8. J. S. R.

Unification of the Method of Analyzing Oils and Fats Used by Tanners and Curriers. BALDRACCO. Turin. *Leather Trades Rev.*, 44, 878. J. S. R.

California Tanbark Oak. WILLIS L. JEPSON. U. S. Dept. Agr., Forest Service, *Bull.* 75, Part I; *Shoe Leather Rep.*, 104, No. 8, 53–6; 104, No. 9, 73–7; 104, No. 11, 61–5; 104, No. 12, 25–9.—J. discusses fully tanbark oak and the tanning industry in Cal. The bark richest in tannin is at the base of the tree; it has a deep red color and has 3 distinct layers—ross, meat, and fiber. The superiority of tanbark oak is not alone the high % of tannin but the quality of tannin and the presence of other acids as gallic and acetic. It is improved by the addition of gambier or quebracho. Cal. black oak and live oak barks are sometimes added. Tables are given dealing with amt. and quality of tanbark oak in various districts, amt. on trees of different sizes, analyses of bark wasted in abandoned tops, of bark left in jayhawked trees, analyses showing distribution of tannin from the base to the top of the tree, analysis of bark samples from different districts, amt. on second-growth trees, analyses of second-growth bark, and of tannin; analysis of bark of the more important trees of the Pacific coast. J. S. ROGERS.

Some Further Remarks Regarding the Use of Wood Pulp Extracts. ANON. *Shoe Leather Rep.*, 104, No. 10, 69–71.—Replying to a recent article condemning the use

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of wood pulp as a tanning agent, the author contends that spruce ext. used in the right way in conjunction with other tans gives desirable qualities for salable leather and is particularly valuable as a filling material for sole leather. J. S. ROGERS.

Economics and Technic of the Beam House. Economical Advantages of Sodium Sulfide. ANON. *Shoe and Leather Rep.*, 104, No. 11, 14.—For the production of superior glazed kid Na_2S is superior to As limes in the beam house in that it is quicker and cleaner, and saves labor and overhead charges. The great saving more than offsets the increased material charges. J. S. ROGERS.

The Drying of Hides and the Soaking of Dried Hides. H. M. OSBORNE. *Leather*, 3, 51, 988–9.—Slow drying of hides simply evaps. moisture. Rapid drying causes the fibers to coalesce and chem. changes take place. The original condition of slowly dried hides may be easily regained on soaking in water. Hides dried at high temps. require chem. means. These were formerly put in stale soaks and part of the hide substance dissolved by bacterial action. The more economical way is to use acids or alkalies. Caustic soda is antiseptic and may be used in 0.1–0.2% soln. without excessive swelling. Na_2S may be used in 0.5% soln. and HCOOH at 0.1–0.25%. The weaker acids are safer than mineral acids. Acids soaked hides should be soaked in clear water before liming. J. S. ROGERS.

Ger., 229,535, Jan. 9, 1909. S. REIDEL. In the manuf. of **artificial sole leather** and the like, compressed skin of animal fibers, in which the fibers run crosswise of each other, is treated with tannic acid, washed, treated with dil. alumina soap soln., dried in lukewarm air, and then satd. with liquids, the first of which being obtained by the soln. of suitable elastic resins, as gutta-percha, balata, etc., in CS_2, CCl_4, $CHCl_3$, etc., the other liquids being hydrocarbons, such as benzine, benzole, etc., and finally ripened by the action of light. The second liquid is obtained from refinery residue of pitchy oils, and the third from highly oxidized pitchy oils.

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30. PATENTS.

Abstracts of patents are included under the foregoing divisions of the Journal. The abstracts of U. S. patents are prepared by Earl T. Ragan, those of the British, French and German patents by O. D. Swett and those of Canadian patents by Russell S. Smart, of Fetherstonhaugh & Co., Ottawa (5 Elgin St.). The abstracts of French patents are prepared, with permission, from the abstracts in *Chemiker-Zeitung*, those of German patents from *Chemiker-Zeitung* and *Chemisches Zentralblatt.*

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CHEMICAL ABSTRACTS

Vol. 6. MARCH 20, 1912. No. 6

1. APPARATUS.

L. C. JONES.

Apparatus for the Demonstration of Faraday's Law and for the Determination of Equivalent Weights. ANON., *Elektrochem. Z.*, 18, 245–7.—A simple app. by which 2 or more 2-arm balances are used to weigh directly the metals as they are deposited on the cathodes from solns. containing the metal, under observation, in different valences or depositing various metals with the same current and observing that the wt. of metals deposited are in accordance with Faraday's law. W. E. RUDER.

Machine for the Demonstration of Alternating Current Phenomena. BR. GLATZEL. Techn. Hochsch., Charlottenburg. *Ber. physik. Ges.*, 13, 821–8.—Description with details of construction of a small machine for this purpose. R. W. MOORE.

Duddell-Mather Wattmeters for Measuring Dielectric Losses at 30,000 Volts. ANON. *Electrician*, 68, 543–4. R. W. MOORE.

A Registering Carbon Filament Electrometer (VILLARD). 4. Rectifying Apparatus (BÖCHENHAGEN). 18.

U. S., 1,015,378. Jan. 23. G. H. COOK. **Acetylene generator.**

U. S., 1,015,867, Jan. 30. L. BADER. **Acetylene generator.**

U. S., 1,015,875, Jan. 30. W. L. DOLBEN. **Hydrogen generator.**

U. S., 1,016,219, Jan. 30. J. J. DYE. **Apparatus for absorbing hydrofluoric acid.**

U. S., 1,016,305, Feb. 6. F. J. TURQUAND and W. E. GRAY. **Apparatus for detecting dangerous gases in coal mines, etc.**

U. S., 1,016,665, Feb. 6. A. L. BLACK. **Acetylene generator.**

U. S., 1,016,681, Feb. 6. L. FALLOT. **Acetylene generator.**

U. S., 1,016,843, Feb. 6. J. H. MINER. **Acetylene generator.**

2. GENERAL AND PHYSICAL CHEMISTRY.

JOHN JOHNSTON.

An Early Physical Chemist—M. V. Lomonossov. ALEXANDER SMITH. *J. Am. Chem. Soc.*, 34, 109–19; *Science*, 35, 121–9. J. J. M.

Proposed System of Notation for Physico-chemical Quantities. ARTHUR A. NOYES. *J. Am. Chem. Soc.*, 43, 1–6. J. J.

Recent Work of the Cryogenic Laboratory of Leyden. M. LAMOTTE. *Rev. gén. sci.*, 22, 902–7.—An account of the recent work of Kamerlingh Onnes. J. J.

The Application of the Kinetic Theory of Gases to Chemical Problems. O. SACKUR. Breslau. *Ann. Physik*, 36, 958–80.—S. attempts to apply the Boltzmann-Planck conception of the relationship between entropy and probability to the explanation of

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irreversible chem. reactions. For this purpose it is necessary to introduce a measure of the "probability" of different chem. substances. This is possible for ideal gases but only on the assumptions that the mols. of gases are not uniformly distributed in the available space but gathered in clusters of finite vol., and that the velocity components have finite differences. Then the laws of chem. equil. can be derived without further hypotheses in regard to the mechanism of the formation of compds. entirely on the basis of the law that every spontaneous chem. reaction leads to a more unordered mol. arrangement. GRINNELL JONES.

The Periodic System of the Elements. EMIL BAUR. *Z. physik. Chem.*, **76**, 569–83.—B. has plotted the at. wts. of the elements as abscissas and the log of the at. vols. as ordinates, using the best available data in computing the at. vol. He discusses the probable errors in the detns. of the at. vols. and shows that in many cases the apparent discrepancies in the graph are due to these errors. A revized form of periodic table is given. J. L. CRENSHAW.

Theory of Monoatomic Solid Bodies. E. GRÜNEISEN. Charlottenburg. *Physik. Z.*, **12**, 1023–8; *Ber. physik. Ges.*, **1911**, 836–47.—A preliminary statement of a theory based upon certain assumptions regarding the forces acting between the atoms, from which are derived a relation between temp. coeff. of compressibility and coeff. of expansion, and expressions for the change of compressibility and of m. p. with pressure in terms of other quantities; these relations are in general accord with existing experimental data. J. JOHNSTON.

Influence of Temperature on the Thermal Coefficient of Expansion. C. L. LINDEMANN. Univ. Berlin. *Physik. Z.*, **12**, 1197–9.—L. tests experimentally the conclusion recently reached by Grüneisen (*C. A.*, **6**, 561) that the ratio between thermal coeff. of expansion and at. heat capacity of an element is independent of temp. For this purpose he measures by a suitable microscope the length of a rod of Al, Cu, Zn, Ag, Pb, at the temp. of liquid H, liquid O, liquid air and room temp. In the following list the first number after the symbol of each element denotes $\alpha\ 10^6$ for the approx. interval of 83 to 292° abs.; the 2nd number that for the interval 81.5 to 90° abs.; and the 3rd for the interval 20.4 to 81° abs.: Al, 168, 98, 38; Cu, 124, 75, 49; Zn, 93, 65, 34; Ag, 156, 132, 98; Pb, 266, 203, 198. The results, which are believed to be accurate within a few %, are compared with the values of C_v calc. for the same temp. intervals by the Nernst-Lindemann equation (cf. *C. A.*, **5**, 2764). Although the ratio of α to C_v varies more than the probable experimental error the agreement is close enough to show that Grüneisen's relation is at least approx. correct. This is especially evident in the case of Al where both α and C_v at low temps. are less than 25% of their value at room temp. but the ratio α/C_v varies only by 5%. GRINNELL JONES.

A Method of Measuring Absolute Viscosity. H. P. GURNEY. *J. Am. Chem. Soc.*, **34**, 24–8.—A new viscosimeter is described, and formulas are derived for detg. abs. viscosity from data obtained by means of this form of app. D. A. MACINNES.

Molecular Complexity in the Liquid State. P. A. GUYE. Univ. Geneva. *J. chim. phys.*, **9**, 504–18.—In reviewing a recent paper of Turner and Merry (*C. A.*, **5**, 1078) G. finds in most cases correspondence with the work previously carried out in his lab. In the case of phenyl urethan, quite different results were obtained which G. would explain by their (T. and M.) having worked in the presence of air instead of *in vacuo*, which might produce variations due to oxidation as well as to solubility of air in the liquid. The admissibility in general of calculating mol. polymerization from surface tension is discussed; all methods based on surface tension or on any property dependent on the same, really apply only to mol. state in the surface film, which is well known to be somewhat abnormal as compared to the body of the liquid. While

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in many cases the mol. wt. in the surface film may be the same as in the liquid itself, in others it may be either polymerized or dissociated, according to which of the 2 processes is favored by the high pressure which is believed to exist in the surface film. In general, the methods of surface tension, b. p., or critical temp. are not so reliable theoretically for the detn. of polymerization in the liquid state as those depending on the properties of the whole liquid, such as, for example, d., mol. vol., viscosity, dilation and compressibility. S. C. LIND.

Systematics of the States of Aggregation of Matter. P. P. VON VEIMARN. *J. Russ. Phys. Chem. Soc.*, **43**, 1477–1502.—A résumé of the author's views on matter. The attraction forces of the mols. of matter in all of its states of aggregation are of a vectorial nature. For the solid state this must be admitted, because otherwise substances, when cryst. from solns., ought always to assume a spherical form which, being the 33d modification of sym. (infinit sym.), is contrary to the principles of geometrical crystallography. The so-called amorphous substances are in reality microcryst., as was shown by the author on more than 200 such substances (von Veimarn, *Grundzüge der Dispersoidchemie*, Dresden, 1911). By analogy with solids, the mols. of fluids also must be assumed to possess a vectorial character, the formation of spherical bodies in Plato's expt. and of round drops in the condensation of vapors being easily explained by the great mobility of the mols. in the fluid state preventing orientation into definit forms. Under the influence of mechanical (pressure), magnetic or elec. energy fluids assume properties usually characteristic of cryst., *e. g.*, double refraction. The amorphous condition of gases and the absence of vectorial forces in their mols. would be in discord with our ideas of structural chemistry and with the ideas of van't Hoff regarding the decrease in valence with rizing temp. With increasing comminution the properties of a cryst. begin to approach those of liquids, *e. g.*, it becomes isotropic. Hence, with an increase in the degree of dispersion the solid becomes less capable of orientation in definit directions. The properties of liquid cryst. show that the sole difference between solid and fluids is a difference in the relation between the degree of dispersion and freedom of orientation. When the vectorial forces are blockaded the degree of orientation diminishes, while that of dispersion increases. For solids the normal condition is a max. of vectoriality, while for fluids the normal state is a min. of vectoriality. The endless variations in the degrees of dispersion, orientation and mobility of different substances makes it impossible to draw sharp lines of demarcation between the different forms of matter. H. M. GORDIN.

Determination of the Transformation Temperatures of Ammonium Nitrate. KARL VOGT. *Physik. Z.*, **12**, 1129–31.—V. has endeavored to det. the transformation temps. of NH_4NO_3 more accurately than has been done. In each detn. the 2 forms stable above and below the point in question were present. The points above 0° were detd. (*a*) by the dilatometer method of van't Hoff and (*b*) by observing the temp. at which the change in birefringence occurs. The temps. were read with a calibrated Hg thermometer. The results are, by (*a*): 32.5° ± 0.05°, 82.26° ± 0.10°, 125.2° ± 0.06°; by (*b*): 32.7°, 83.9°, 125.4°, with a probable error of 0.2°. The inversion point below 0° was detd. by heating and cooling curves, the temp. being read with a thermoelement. This temp. is given as —16.6°, and is not accurate to more than 1°. J. L. C.

The Application of the Theory of Chemical Potential to the Thermodynamical Theory of Solutions. I. The General Theory of Chemical Potential in a Binary System, Osmotic Pressure and Vapor Pressure of Solutions. S. A. SHORTER. Leeds Univ. *Phil. Mag.*, **22**, 933–42.—A mathematical application of Gibb's theory of chem. potential, the scope of which is indicated by the title. A. T. CAMERON.

Solutions and Dissolecules. A. COLSON. *Bull. soc. chim.*, **9**, 1008–15.—Further remarks (cf. *C. A.*, **6**, 316). The term "dissolecule" has been coined to denote the

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particles actually present in a soln.; according to C., the dissolecule of HOAc is $[C_2H_4O_2]_2$; that of HCl is $HCl.nH_2O$, thus dispensing with the necessity of assuming the ions H^+ and Cl^-. J. JOHNSTON.

Osmotic Pressure. M. PRUD'HOMME. *Bull. soc. chim.*, 9, 1015–7; cf. *C. A.*, 6, 316.—Another presentation, which leads to the conclusion that "the pressure exercized by the mols. of a dissolved substance in a certain vol. of a solvent is equal to the attraction of the solute mols. for those of the solvent." J. J.

Composition and Vapor Tension of Solutions. V. Variation of Partial Pressure with the Temperature. Solution and Mechanical Mixtures. M. S. VREVSKII. *J. Russ. Phys. Chem. Soc.*, 43, 1446–57.—Mathematical considerations of the Duhem-Margules' equation show that when 2 liquids are miscible without any thermal effect (Q), the temp. coeff. of the vapors is the same as for immiscible liquids forming a mechanical mixture only. In both cases the displacement of the equil. of the vapors caused by a change in the temp. is the sole result of a change in the physical properties of the pure liquids; the relation between the comps. of the vapors at 2 temps., t_1 and t_2, is given by the equation, $y_1/y_2 = P'_1P_2/P_1P'_2$ (I), in which y_1 and y_2 are the ratios of the amts. of one component to the other at t_1 and t_2 resp., P'_1 and P'_2 the vapor pressures of the pure liquids at t_1, and P_1 and P_2 their v. p. at t_2. Thus for mixtures of C_6H_6 and PhCl, for which Q is nearly zero, we can calc. the change in the proportion of C_6H_6 in the vapors produced by raising the temp. from 0° to 280° by substituting in (I) the values of P_1 and P'_1 for C_6H_6 (26.54 mm. at 0° and 32782 mm. at 280°) and of P_2 and P'_2 for PhCl (2.56 mm. at 0° and 12925 mm. at 280°) given by Young (*J. Chem. Soc.*, 55, 486). (I) then becomes $y_{280} = 0.2446y_0$, where y_{280} is the ratio of C_6H_6 to PhCl in the vapors at 280° and y_0 the same ratio at 0°. If G_0 and G_{280} represent the percentages of C_6H_6 of the vapors at 0° and 280° resp., we get from the last equation, $G_{280} = 24.46G_0/(100 - 0.7554G_0)$. The following table gives the values of G_0 and G_{280} in different mixtures of C_6H_6 and PhCl:

G_0	10	20	30	40	50	60	70	80	90
G_{280}	2.64	5.76	9.49	14.02	19.65	28.84	36.33	49.45	66.76

It will be seen that in most mixts. of C_6H_6 and PhCl the amt. of C_6H_6 in the vapors drops to less than 50% when the temp. rizes from 0° to 280°. When Q is not zero, the value of y_1/y_2 is influenced by 2 factors: a physico-mechanical, as in the preceding system, and a physico-chem., depending upon the changes in Q with changes in the temp. and relative amts. of the components. From an exam. of Kirchhoff's equations the author derives the following general equation for mixtures of such liquids: $y_1/y_2 = (P'_1P_2/P_1P'_2)e^{\int_{t_2}^{t_1}(dQ/dx).(dT/RT_2)}$ ....(II), in which R is the gas const., Q the heat change produced by dissolving x g. mols. of one of the liquids in $(1 - x)$ g. mols. of the other, T the temp. In absence of thermochemical data for the changes in dQ/dx with the temp., the author limits himself to a qualitative exam. of (II . If the temp. is const., the value of y_1/y_2 will change only with x, but to every value of x will correspond 2 values of y_1/y_2, one positive, the other negative. In one region the above 2 factors will act in the same direction, while in another they will act in opposit directions, the border between the regions being where $dQ/dx = 0$. If for a given conc. dQ/dx is independent of the temp., (II) assumes the form, $y_1/y_2 = (P'_1P_2/P_1P'_2)e^{(dQ/dx).(1/T_2-1/T_1)R}$ ....(III). If $dQ/dx = 0$, (III) becomes (I). If within the temps. t_2 and t_1 for a given conc. $dQ/dx > 0$, the value of y_1 calculated from (II) is greater than its value from (I), while if $dQ/dx < 0$, y_1 obtained from (II) is smaller than its value from (I). These deductions are verified on aq. mixts. of MeOH for $t_2 = 39°$ and $t_1 = 59.44°$, EtOH for $t_2 = 39.76°$ and $t_1 = 74.79°$,

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and PrOH for t_2 = 49.92° and t_1 = 79.8°. According to Bose (*C. A.*, 1, 1820) in concs. of 30–100% MeOH, of 10–70% EtOH and 15–50% PrOH, $dQ/dx<0$, while for concs. of 50–100% PrOH, $dQ/dx>0$. In accord with this tables are given showing that for MeOH and EtOH in the above concs. and for PrOH in concs. of 15–50% y_1 calc. from (II) is smaller than when calc. from (I), while for concs. of 50–100% PrOH y_1 from (II) is greater than from (I). This is also in accord with the author's previous results (*C. A.*, 5, 3747) which showed that the amts. of MeOH and EtOH in their aq. mixts. decrease with the temp., while the amt. of PrOH in the vapor increases with the temp.

H. M. Gordin.

Dilatometric Investigations. I. New Form of Dilatometer for Mixtures of Liquids. Filippo Bottazzi and G. Buglia. Ist. fisiol. sper. r., Univ. Napoli. *Atti accad. Lincei*, 20, II, 623–7.—Two forms of app. are described, both based on the same principle; the 2nd is, however, much simpler and more effective. Into a cylindrical tube is fitted a hollow ground-glass stopper carrying at its upper end a graduated capillary tube. The lower end of the stopper is fastened to a glass plate, such as a microscope cover-glass, with paraffin or a fat which will slowly melt at the temp. at which the expt. is to be carried out. The tube and the hollow stopper are then filled with the solns. to be investigated at a temp. only a few degrees below that at which the measurements are to be made, the stopper put into place and the whole app. placed in the thermostat. By properly choosing the fat or paraffin, the solns. will have time to acquire the desired temp. before the fat melts, with consequent dropping off of the cover-glass and mixing of the solns. By introducing a small piece of iron above the cover-glass, mixing of slowly diffusing solns. can be effected by means of a magnet. If only very small vols. of one liquid are to be used, both the tube and stopper can be filled with the liquid to be used in larger quantity and the other introduced in a small tube closed at both ends with the fat. **II. Preliminary Results with Non-colloidal Solutions.** *Ibid.*, 627–33.—The calibration of the app. and tests of its accuracy by mixing H_2O with H_2O and with various electrolytes are described.

Chas. A. Rouiller.

The Solubility of Difficultly Soluble Salts. M. Prud'homme. *J. chim. phys.*, 9, 519–37.—P. uses the cond. data of Kohlrausch for NaCl at 18° to det. the value of the diln. v corresponding to Λ_0 from the relation $\Lambda = cv^{1/n}$. He chooses as a probable mean for infinit diln. 104,000 l, which he terms V. P. further develops a relation between Λ_V and Λ_v, and their corresponding dilns. V and v (v and Λ_v being the diln., and the corresponding value of Λ for the satd. soln.): $\log(\Lambda_V - \Lambda) = (\log V - \log v)/n$ and finds for n a mean value of 3.06; that is, the difference between the mol. cond. limits is sensibly equal to the cube root of the ratio of the corresponding dilns. Placing $(\Lambda_V - \Lambda_v)/\Lambda_V = r$, and $1/\Lambda_V = R$, and substituting, one obtains, $r/R = (v/V)^{1/3.06}$ which equation may be used in calculating solubility from cond. data. Several examples illustrating the application of the method are given together with a table comparing P.'s results with those of Kohlrausch for about 40 difficultly sol. salts, in which the relation $rv^{1/3.06}$ = const. holds satisfactorily for the anhyd. salts, but not for the hydrated ones.

S. C. Lind.

The Solubility of Alkali Metal Salts in the Corresponding Acids. W. Herz. Breslau. *Z. anorg. Chem.*, 73, 274–6.—The solubilities of LiCl, KCl and NaCl in HCl solns. of concs. up to 3.2 N were detd.; a marked decrease of solubility with increasing conc. of acid was observed in each case. The solubility of KCl decreases on the addition of HBr, but since double decomp. takes place, the decrease was less than that produced by a corresponding conc. of HCl. The solubility of NaOAc decreases but slightly on the addition of HOAc. The solubilities of $Na_2SO_4.10\,H_2O$ and K_2SO_4

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increase with increasing conc. of H_2SO_4. In every case the relation between solubility change and conc. of acid is linear. D. A. MacInnes.

Studies on Chemical Affinity. VI. The Affinity of Formation of Naphthalene Picrate. J. N. Brönsted. Copenhagen. *Z. physik. Chem.*, **78**, 284–92.—The conc. of picric acid (HP) in equil. with solid naphthalene (N) and naphthalene picrate (NHP) is 0.00651 *N* at 20° and 0.00425 at 0°. The solubility of HP in H_2O is 0.0515 at 20° and 0.0357 at 0°. An H electrode did not give const. results in these solns. owing to reduction of HP. This difficulty was overcome by adding solid KCl and KP. Owing to the slight solubility of KP, free HCl is produced and the soln. contains very little HP. The conc. of HCl in equil. with solid HP, KCl, KP is 2.422 *N*. The conc. of HCl in equil. with solid N, NHP, KP is 0.172 *N*. B. measured the e. m. f. of a series of cells with H and calomel electrodes and as electrolytes a satd. soln. of KCl with HCl varying from 0.0043 to 2.4285 *N*; by interpolation to the values of HCl corresponding to the equil. values given above he finds π = 0.0888 for the cell; H | N, NHP, KCl, KP, HCl (0.172 *N*), HgCl | Hg-Hg | HgCl, HP, HP, KCl, HCl (2.422 *N*) | H_2; all substances given in the electrolyte except HCl are present in satd. soln. with excess of solid. The electromotively active reaction in this cell is N + HP = NHP (all solid) and the potential therefore measures the free energy of this reaction. Hence, A = 2050 cal. at 20.1°. By calorimetric measurements he finds U = 880 cal.; hence, $\delta dA/dT$ = +4.0 cal per degree, *i. e.*, the compd. becomes more stable with rizing temp. Grinnell Jones.

Study of the Variation with Temperature of the Electromotive Force of Cells. M. Bedeau. *Ann. chim. phys.*, **24**, 553–63.—The temp. coeff. of e. m. f. is about —0.0011 for the cells Cu | $Cu(NO_3)_2$ | $AgNO_3$ | Ag and Cu | $Cu(ClO_3)_2$ | $AgClO_3$ | Ag, but B.'s cells were not reproducible. He concludes that the Helmholtz equation is verified exactly if Berthelot's results for the heat of reaction are accepted—a conclusion apparently novel in France. G. J.

Alleged Color of Ions. G. Magnanini. Modena, lab. chim. gen. *Gazz. chim. ital.*, **41**, II, 425–9.—After pointing out that some of his recent work makes the existence of atoms and molecules, and therefore of ions, improbable, M. announces that investigations being carried out by Bongiovanni under his directions show that the rotatory power of active salts is not influenced by the degree of their electrolytic dissociation. Chas A. Rouiller.

2,6-Dimethylpyrone as Solvent. G. Poma. *Gazz. chim. ital.*, **41**, 518–38.—The following consts. of γ-dimethylpyrone were detd.: m. 132°; d_{137}, 0.9953; d_{183}, 0.9483; mean sp. heat of the solid between 0–100°, 0.368; sp. heat between 152.3–183°, 0.550; latent heat of fusion, 560 cal.; mol. lowering of the f. p. (calorimetrically) 58.7, (cryoscopically, with Ph_2N_2, anthracene, phenanthrene and phenanthroquinone) 64.6; surface tension (137°) 30.76, (183°) 26.31; mol. surface energy (137°) 767.1, (183°) 677.5; temp. coeff. $\Delta\gamma/\Delta\varepsilon$ 1.94; coeff. of mol. association, 1.21 (?). Mol. wt. of various substances dissolved in the pyrone, detd. by the f. p. method: BzOH, 112–6; thymol, 128–40; Bz_2O, 151–7; Me_3NPhI, 146–68; $MeC_6H_4NMeEt_2I$, 164–70; NaI, 96–9; LiBr, 62–6; LiCl, 41–8. Elec. cond. at 137° of various electrolytes in the pyrone (only the values at the 2 extreme dilns. are given; the first figure represents the diln. in l., the 2nd, the mol. cond.; the sp. cond. of the pyrone itself is 5.8×10^{-6}): Me_3NPhI: 18.54, 10.03; (9.03, 8.53); 6.097, 9.16. $MeC_6H_4NMeEt_2I$: 16.505, 10.05; (9.646, 10.70); 6.897, 10.50. NaI: 88.07, 51.67; 3.746, 29.68. LiBr: 188.95, 56.45; 6.662, 25.23. LiCl: 90.425, 21.66; 3.278, 5.32. These results show that the mol. wts. of org. OH compds. come out too low rather than too high as would be expected of an associating solvent; probably this is due to the formation of ionizable salts formed between the solute and the solvent. The mol. wts. of electrolytes (except LiCl) are considerably

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lower than the calc. values; for the substituted NH_4 iodides; this is not in conformity with the cond. data. The pyrone is a slightly associated liquid with considerable dissociating power which, however, it shows in a sense contrary to that exhibited by H_2O; in the case of the alk. halides the dissociation decreases in the order NaI ⟶ LiBr ⟶ LiCl. This shows the necessity of considering the process of ionization from the chem. as well as the physical standpoint. C. A. R.

Binary Systems of which one Component is an Organic Substance and the Other a Mineral Salt. B. N. MENSHUTKIN. St. Petersburg. *J. chim. phys.*, 9, 538–58.—For purposes of generalization, M. brings together the results of cryohydric and solubility detns. from 23 papers, all of which have been published in *J. Russ. Phys. Chem. Soc.* and republished either in the *Z. anorg. Chem.* or the "*Annals of the Polytech. Inst. of Peter the Great.*" *A. Systems containing the bromide or iodide of Mg.* On account of the hygroscopicity of $MgBr_2$ and MgI_2, the following general method was employed in the prep. of the mol. compds. Pure Mg, placed under dry Et_2O, was acted on by dry Br or I, forming with the evolution of much heat, a new liquid phase consisting of $MgBr_2.2Et_2O$ (or $MgI_2.2Et_2O$), from which compds. the ether can be readily displaced by any of the other organic compds. used. In general, these mol. compds. form well shaped crystals, if the original organic compd. is capable of forming definit crystals. They nearly all m. without decomp. and show a marked preference toward compds. of 1 mol. of salt to 6 mols. of organic compd., more rarely also with 4, 3, 2 and 1 mols. of the latter. The system acetamide-$MgBr_2$ shows compds. with 6 and 2 mols. of acetamide, m. 169° and 160° resp. (latter with decomp.), cryohydric p. 50°.5 and 136°. MgI_2 gives corresponding compds. only one of which however has stable m. p. Systems with urethan and also with urea show compds. with 6 and with 4 mols. to 1 $MgBr_2$ or MgI_2. Aniline-$MgBr_2$ shows salts with 6, 4 and 2 of aniline to 1 of salt, all m. with decomp.; aniline-MgI_2 shows 6 and 4 to 1, both m. with decomp. The following members of the alc. series give compds. of 6 alc. to 1 salt ($MgBr_2$ or MgI_2), which freeze as follows: MeOH, (with $MgBr_2$) 190°, (with MgI_2) 210°; EtOH, 108.5°, 146.5°; C_3H_7OH, 52°, 65°–70°, C_4H_9OH(*iso*), 80°, 95°–100°; $C_5H_{11}OH$(*iso*), 46°. The organic acids of the aliphatic series up to C_3H_7COOH all form 6–1 compds. with both salts. The solubility curves for the compds. with $MgBr_2$ are all of the same type except for HCOOH, in which the solubility rizes gradually from room temp. on, instead of showing a very steep rise at about 90–100°. With some of the ketones and aldehydes the following compds. were found and studied: 1 MgI_2–6 benzaldehyde (m. 139°); and –6 Me ketone (m. 106.5°) 1$MgBr_2$ –6 benzaldehyde (m. 159°) and –6 Me ketone (m. 92°). The mol. compds. between MgI_2 and the esters of AcOH from CH_3- up to C_5H_{11}- are all 1–6 compds. and present solubility curves of considerable interest. MgI_2.6 AcOMe m. under the liquid at 103°. The systems of Et_2O with $MgBr_2$ and MgI_2 show 1–2 compds. which have several points of interest besides being the starting point for all the other compds. The MgI_2 compd. m. under the solvent at 53.5° and the 2 immiscible layers show a critical p. of solubility at 38.5°. In the case of the system $MgBr_2$-Me_2O 2 compds. 1–1 and 1–2 are formed and a variety of complicated relations are met with, for a full understanding of which one is referred to the diagram accompanying the original. The order of relative stability or order of displacement of one of the organic compds. by another is the same for both the MgI_2 and $MgBr_2$ compds., and is as follows, in the order of decreasing stability, each compd. being able to replace all those coming after it, those of the same power being bracketed together: urea, H_2O, (aniline, acetamide, urethan, formic acid), MeOH, EtOH, (MeCN, Ac_2O), AcOH, C_3H_7COOH (Et formate, benzaldehyde), AcOMe (acetal AcCl, Et_2O, anisole). Among the substances containing O the order of replacement is the same as that when arranged by descending dielec. consts.; no such regularity

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exists among the compds. containing N, among which the order of stability seems to depend more on the chem. nature. A diagram of solubility curves of compds. shows that the increase of solubility is in the same order as the stability. *B. Systems in which one component is* $CaCl_2$. In case of MeOH, compds. of 4, 3 and 1 mols. to 1 mol. $CaCl_2$ are found. Solubility curves are similar to those for $MgBr_2$ in corresponding alcs. AcOH forms the compd. $CaCl_2.4$ AcOH, m. p. 73°; the solubility curve is similar to that for $MgBr_2.6$AcOH. Acetamide forms at least the 2 compds. 6 and 3 to 1 $CaCl_2$, and perhaps others. *C. Systems: Acetamide—salt of Na or K.* KI forms no compds. with acetamide. NaBr and NaI give each only the 1–1 compd.; the whole cryohydric relations show striking similarity to those found for the same salts with water. *D. Systems containing* $AlCl_3$ *and* $AlBr_3$. The low m. p. of $AlCl_3$ (194°) and of $AlBr_3$ (96°) have permitted the detn. of their complete cryohydric curves with many organic substances. With $C_6H_5NO_2$ one compd., $AlBr_3.C_6H_5NO_2$, occurs (m. 87°). $AlCl_3$ forms with $C_6H_5NO_2$ a 1–1 compd. (m. 90°) and 1–2 (30.5°). The 12 systems formed by the 2 salts with the 3 nitrochlorobenzenes, show each a 1–1 compd., but in addition the $AlCl_3$ shows a 2nd with the *o*- and *m*-nitro compds. and $AlBr_3$ another with the *o*-. The ascending order of the m. ps. is *o*-, *m*-, *p*-. Some of the aromatic hydrocarbons were examd. with negative results as regard compd. formation. S. C. Lind.

Fusibility and Flow Pressure of Mixtures of Isomorphous Salts. I. B Vrzhesnevskii. Polytechn. Inst., St. Petersburg. *J. Russ. Phys. Chem. Soc.*, 43, 1364–92.—Tresca's method (*Compt. rend.*, 59, 754; 60, 398; 64, 809) was used for detg. the flow pressure (hardness) of mixtures of following systems: KBr-KCl, KBr-KI, KCl-KI, KCNS-NH_4CNS, KCNS-RbCNS, and KCNS-NaCNS. The results were compared with those obtained by detns. of the f. p. curves of the same systems. It was found that solid solns. of salts follow the same rules as were established for solid metallic solns. by Kurnakov and Zhemchuzhnuii (*C. A.*, 3, 303). The important details of the work represented by numerous curves and tables are as follows: The f. p. curve of the system KCNS-NaCNS shows a eutectic (e.) p. at 123.5° (30 mol. % NaCNS) and a transition (t.) p. at 143°, indicating formation of the β-variety of KCNS (Gossner, *Z. Kryst. Min.*, 38, 136). There are several other t. ps. at 102° in concs. of 10–40 mol. % NaCNS, most probably due to formation of a new solid phase NaCNS.3 KCNS, which could not be recryst. without decomp.; its production was corroborated by detns. of the heats of soln. of the system, the max. of heat absorbed (1000 cal.) corresponding to a compd. of above formula. The system NH_4CNS-KCNS shows a continuous series of solid solns. The cooling curve has 4 singular points: a t. p. at 146°, indicating change of liquid NH_4CNS to the solid phase (α), another t. p. at 120° (change of α-NH_4CNS to the β-variety), a 3rd at 90° (change of β-NH_4CNS to the γ-variety), and a e. p. at 100°, indicating partial transformation of NH_4CNS into $CS(NH_2)_2$. A similar e. p. was observed on the curve of the system NH_4CNS-$CS(NH_2)_2$. The system RbCNS-KCNS shows continuous solid solns. with a min. f. p. The system KCl-KI shows continuous solid solns. which decompose on cooling. This is corroborated by the enamel-like appearance of the solidified mass characteristic of mechanical mixtures, and by detns. of the heats of soln. of mixtures whose velocity of cooling was made to vary, quick cooling preventing the decomp., which, however, becomes complete on standing within about 4 weeks. The decomp. is accelerated by keeping the solid at higher temps. (Beketov, *Z. anorg. Chem.*, 40, 355). The systems KBr-KCl and KBr-KI belong to Roozeboom's 3rd type, showing a continuous curve with a min. f. p. which for the 1st system is at 716° (60 mol. % KBr), and for the 2nd at 589° (50 mol. % KBr); with the exception of points indicating transition from the liquid to the solid phase there is no other singular p., showing that even at lower temps. the solid solns. suffer no decomp. On prolonged standing, however, decomp. sets

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in, the transparent crystals becoming turbid and assuming an enamel-like appearance. This was corroborated by detns. of the heats of soln. of the mass cooled at different rates, and also after keeping it for 2–6 weeks. The hardness (H) of the pure halides is the smaller the quicker the cooling in their prep., while for mixtures of different halides the reverse is true, owing to formation of solid solns. H for the systems KCl-KBr and KBr-KI was detd. both on fresh samples and on samples kept for 5 weeks. In both systems there are max. values of H: in the 1st at 40 mol. % KBr, in the 2nd at 60 mol. % KBr. H for fresh samples is more than double that of the hardest of the components, but on keeping H gradually decreases towards the average of the 2, showing decomp. of the solid solns. The system KCl-KI has one max. of H at 90 mol. % KCl, another max. at 10 mol. % KCl and a min. at 40 mol. % KCl. The min. is lower than H for the softer of the components (KI). The system KCNS-NH_4CNS has a max. of H at about 70 mol. % KCNS. The curve shows presence of mechanical mixtures of β-NH_4CNS with solid solns. in β-KCNS, and solid solns. of the β-varieties of the components. The formation of β-NH_4CNS is accompanied by a change in color from white to greenish gray. The system KCNS-RbCNS shows a max. of H at 80 mol. % RbCNS. The system KCNS-NaCNS has a max. of H at 80 mol. % of KCNS and a min. at about 60 mol. % KCNS. The min. is most probably due to the formation of NaCNS.3KCNS. H. M. Gordin.

The Simplest Kind of a Hardness Diagram. N. S. Kurnakov and I. B. Vrzhesnevskii. Polytechn. Inst., St. Petersburg. *J. Russ. Phys. Chem. Soc.*, 43, 1392–7; cf. preceding abstr.—While the diagrams of most solid mixts. are more or less complicated through the formation of solid solns., the f. p. and H curves of the system KBr-KF are very simple and show that the 2 salts form mechanical mixts. only. The f. p. curve consists of 2 branches meeting at the e. p. at 580° (40 mol. % KF), and the addition of only 3% of one of the salts to the other produces a e. p., showing either complete absence or insignificant concs. of solid solns. The H curve is almost a straight line, showing that H increases almost in direct proportion to the amt. of KF. H was measured by detg. the flow pressure. A comparison of KF, KCl, KBr and KI shows that H increases with the decrease in the at. wt. of the halogen. H. M. G.

Thermal Analysis of Binary Mixtures of Calcium Chloride with Chlorides of Other Bivalent Elements. Carlo Sandonnini. Lab. chim. gen. r., Univ. Padova. *Atti accad. Lincei*, 20, II, 496–503; cf. *C. A.*, 5, 3647.—The f. p. of the salts used were found to be: $CaCl_2$, 772°; $SrCl_2$, 872°; $BaCl_2$, 960°; $CdCl_2$, 568°; $PbCl_2$, 495°; $MnCl_2$, 650°; the transformation p. of $BaCl_2$, 923°. $CaCl_2$ forms mixed crystals with $SrCl_2$, $CdCl_2$ and $MnCl_2$ whose temp. of crystn. show a minimum (646° for about 35 mol. % $SrCl_2$, 545° for 85% $CdCl_2$, 583° for 62% $MnCl_2$). With $BaCl_2$ and $PbCl_2$ it forms simple eutectics (600° for 35% $BaCl_2$, 468° for 83% $PbCl_2$). Chas. A. Rouiller.

Thermal Analysis of Binary Mixtures of Chlorides of Elements of the Same Valency. Carlo Sandonnini. Inst. chim. gen. r., Univ. Padova. *Atti accad. Lincei*, 20, II, 503–10.—Summary of the results obtained by S. and others in the study of the chlorides of Li, Na, Cu′, Ag, K, Rb, Tl′, Ca, Sr, Ba, Cd, Hg″, Sn″, Pb, Mn. C. A. R.

Thermal Analysis of Binary Mixtures of the Chlorides of Bivalent Elements. Carlo Sandonnini. Lab. chim. gen. r., Univ. Padova. *Atti accad. Lincei*, 20, II, 646–53; cf. preceding abstr.—The systems $SrCl_2$-$BaCl_2$, $SrCl_2$-$CdCl_2$, $SrCl_2$-$PbCl_2$, $SrCl_2$-$MnCl_2$, $BaCl_2$-$CdCl_2$, $BaCl_2$-$PbCl_2$ have been studied. $SrCl_2$ gives simple eutectics with $CdCl_2$ (502° for 58 mol. % $CdCl_2$) and with $MnCl_2$ (499° for 45% $MnCl_2$), and mixed crystals in all proportions with $BaCl_2$ and $PbCl_2$. $BaCl_2$ gives a simple eutectic with $CdCl_2$ (450° for about 57% $CdCl_2$), and mixed crystals with $PbCl_2$. C. A. R.

Relation between the Capacity of Potassium Halides to Form Solid Solutions and the

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Temperature. I, II. M. AMADORI AND G. PAMPANINI. Ist. chim. gen. r., Univ. Padova. *Atti accad. Lincei*, **20**, II, 473–80, 572–7.—The systems KCl-KBr, KBr-KI and KCl-KI were studied by the thermal method at high, and by the solubility method in H_2O at low temps. The solubility of the pure salts in 100 g. H_2O at 25° was found to be: KCl, 36.12; KBr, 68.47; KI, 149.26 g. For KCl-KBr at 25° the curve plotted against mol. % of chloride in the crystals as abscissas and % of chloride in the soln. as ordinates is continuous; the lower part of the curve lies to the left, the upper to the right of the diagonal, crossing the latter for 40% chloride in the crystals and dissolv d salts. For KBr-KI, the curve representing % of bromide closely follows the diagonal up to 25%, then runs parallel to the axis of ordinates up to 94%. The solubility isotherm shows a point of inflection where the combined solubility is greatest (955 mg. mols. in 100 g. H_2O). For KCl–KI, the curve representing the relative comp. of crystals and soln. is parallel to the axis of ordinates from about 7 to 99 mol. % of KCl, and the point of inflection in the isotherm corresponds to a total of 945 mg. mols. in 100 g. H_2O. The f. ps. of the pure salts used in the high temp. expts. were found to be: KCl, 774°; KBr, 740°; KI, 680°. KCl–KBr give mixed crystals in all proportions, with a slight minimum, at high temp. The same is true for KBr–KI, the minimum in the crystn. curve being somewhat more pronounced. KCl–KI, up to 49 mol. % KCl, and from 91 to 100% KCl, give mixed crystals in all proportions. C. A. R.

Thermal Analysis of Binary Mixtures of Chlorides of Monovalent Elements. C. SANDONNINI AND P. C. AUREGGI. Lab. chim. gen. r., Univ. Pavia. *Atti accad. Lincei*, **20**, II, 588–96; cf. *C. A.*, **5**, 3366.—The systems LiCl-TlCl, NaCl-TlCl, KCl-TlCl, RbCl-AgCl, RbCl-TlCl, AgCl-TlCl have been studied. RbCl gives a simple eutectic with AgCl (253° for 60 mol. % AgCl); TlCl with LiCl (342° for 62% TlCl) and with NaCl (412° for about 85% TlCl). With KCl and RbCl, TlCl forms mixed crystals within quite wide limits; with AgCl, a compd., 2 AgCl.3TlCl. C. A. R.

The Dispersion of Birefringence in a Two-phase System. H. AMBRONN. Jena. *Z. Chem. Ind. Kolloide*, **9**, 147–53.—Celluloid shows ordinary birefringence when put under a strain, unless the strain results in a deformation of the celluloid, when the birefringence while still persisting, differs from the ordinary, in that its sign is changed, and in the dispersion. Ordinarily the indices of refraction for the ordinary and extraordinary ray are so nearly the same for all wave lengths of light that the difference can be neglected, and this is true for celluloid; but if the celluloid is deformed by pressure the difference in phase (δ) is twice as great for blue as for red rays, if $\delta = d(n_2 - n_1)/\lambda$ where d = the thickness of the layer of celluloid, λ the wave length, n_1 and n_2 the refractive indices. This is partially explained as due to the two phases present, collodion alone showing positive birefringence, camphor negative. The refraction of a mixture is an additive property, as was shown by forming mixed crystals of Sr and Pb dithionates; the dispersion of the Sr salt is 1.7, of the Pb salt 0.95, while that of the mixed crystals lies between these two values. Crystals could be found in which refraction for red light was greater than blue, and *vice versa*, and in which the refraction was the same, but opposit in sign. H. ISHAM.

The Heat of Formation of Titanium Dioxide. W. H. MIXTER. Yale. *Am. J. Sci.*, **33**, 45–8.—The combustion of metallic Ti was hastened by distributing the finely divided metal through cotton fibers. Corrections were made for uncombined Ti. Analysis of the resulting oxide showed slightly less O than corresponds to the formula TiO_2. The heat evolved when 32 g. O combine with Ti is found to be 218,500 cal. (mean of 5 detns.). Evidence is given of a slow oxidation of the powdered Ti in air at room temp. D. A. MACINNES.

The Ether Calorimeter. F. NEESEN. Berlin. *Physik. Z.*, **12**, 1073–4; *Ber. physik. Ges.*, **1911**, 1023–6.—N. compares the sensitiveness of his form with that of

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the form independently devized by Duane. Both use 2 bulbs containing Et_2O, connected by a capillary, and containing reëntrant tubes for the substance under investigation. But D. receives the heat in a relatively large mass of Et_2O and measures the resulting difference of vapor pressure, while N. evaps. the Et_2O from a wick enclosing the reëntrant tube, and measures the vol. change—not quite at const. pressure, however—by the motion of an ether index in the capillary. He finds this method quicker and some 50 times as sensitive. D., however, had actually read to $^1/_2$ the sensitiveness found by N. for app. of the same dimensions, from which it would seem that the effective sensitiveness, *i. e.*, the smallest quantity detectable with certainty, might not be so different for the 2 methods as the apparent sensitiveness. W. P. WHITE.

Velocities of Reaction in Heterogeneous Systems of Several Phases. I. J. BOSELLI. *J. chim. phys.*, 9, 689–755; cf. *C. A.*, 5, 1865.—B. discusses in detail the theories of Wildermann and of Nernst for reactions in heterogeneous systems. In general, he objects to Nernst's theory as being too schematic, and thinks that convection as well as diffusion must be taken into account in considering the drop in conc. between the surface of reaction and the main body of the homogeneous phase. The theory of Nernst for rate of soln. is not applicable to the passage of a gas through a liquid. Chem. reactions taking place between a solid and a liquid phase are frequently disturbed by the products of the reaction even where no insol. coating is formed on the solid. Other reactions to be classed as heterogeneous are the ones in which the reaction takes place on the surface of a contact catalyzer, and diffusion to and from the surface must be considered. The catalytic effect produced by colloidal metals and by enzymes are termed micro-heterogeneous catalyses; the attempts to apply Nernst's theory to such systems have uniformly failed. B.'s theory is developed only for the case where chem. action is rapid as compared with the physical processes of diffusion and convection. The general theoretical development on these assumptions leads to the deduction of 3 laws for the velocity of soln. Velocity is proportional (1) to the difference in conc. of the satd. layer and the bulk of the soln., (2) to the square root of the velocity of the convection current, (3) to the square root of the coeff. of diffusion. And when chem. action is rapid, the same laws apply to such action in heterogeneous systems. II. The experimental work consists in the measurement of rate of soln. of O and CO in H_2O and of the rate of oxidation in aq. soln. of some oxidizable substance, such as pyrogallol or hemoglobin by gaseous O. Only rates of soln. are reported in the present paper. The use of a chronograph enabled one to make measurements of the change of pressure at very short intervals of time; these measurements were taken directly as the differential rate. In general, the results obtained for the rate of soln. of O and CO in H_2O agree satisfactorily with the requirements of the 3 laws stated above. S. C. LIND.

Observations on the Question of the Nature of the Solvent, and the Relation between Adsorption and Dissociation. W. OSTWALD. *Z. Chem. Ind. Kolloide*, 9, 189–95.—Hydration in soln. is a case of adsorption. Dissociation of ionogens and hydration go hand in hand, *i. e.*, the more dil. a soln. the greater will be its degree of ionization, and of hydration. The regular adsorption formula $x/m = k(c - x)^n$ may be read $x = k(c - x)^n$ if m = unity; while A. A. Noyes' (*C. A.*, 2, 614; 3, 2770; 5, 3530) formula for ionization, $C(1 - \gamma) = K_1(C\gamma)^r$ may be converted to a form similar to that for adsorption $C\gamma = K_2(C - C\gamma)^p$ where $K_2 = 1/K_1$, $p = 1/r$. This suggests an explanation of ionization, namely, that in conc. solns., of say KCl, the mol. has associated with it a small amt. of adsorbed water; if the soln. is farther diluted more H_2O is adsorbed until finally the mol. is split apart into two ions by the pressure of the adsorbed water. The facts that adsorption and ionization show similar maxima, and are neither of them much influenced by changes in temp. and that the exponents n and p vary

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within about the same narrow limits, all indicate that the two are closely related phenomena. H. ISHAM.

Anomalous Adsorption. A. LÖTTERMOSER. Dresden. *Z. Chem. Ind. Kolloide*, 9, 135–6; cf. Löttermoser and Rotha, *C. A.*, 2, 1775; W. Biltz, *C. A.*, 5, 619.—The adsorption of KI by AgI reaches a max., then decreases as the conc. of KI soln. increases. This is possibly due to the coagulating effect of KI on the AgI, thus decreasing its total surface. H. I.

Coagulation of Copper Ferrocyanide. N. PAPPADÀ. Cremona, lab. chim. r., Ist. tech. *Gazz. chim. ital.*, 41, II, 470–5.—Colloidal solns. of this salt show he same phenomena as those of Berlin blue (cf. *C. A.*, 4, 1706). CHAS. A. ROUILLER.

Coagulation of Ferric Hydroxide. N. PAPPADÀ. *Gazz. chim. ital.*, 41, II, 476–94.—From a study of colloidal solns. of $Fe(OH)_3$ prepared by Graham's method, P. concludes that the coagulation of positive colloids is produced by anions; the coagulating power of anions increases with the no. of elec. charges they carry, univalent ions having the same influence; the OH^- ion has a much greater influence than Cl^-, Br^- or I^- because it has a greater velocity of migration and hydro-diffusion; non-dissociated organic compds. have no coagulating power. C. A. R.

Nature of the Coagulation and Gelatinization of Silicic Acid. N. PAPPADÀ. *Gazz. chim. ital.*, 41, II, 495–517; *Z. Chem. Ind. Kolloide*, 9, 164–75; cf. *C. A.*, 3, 1360, 1960; 4, 2243.—Colloidal solns. of silicic acid may be considered as capillary vessels between the walls of which and the H_2O is established a double elec. layer. As the ions of an electrolyte diffuse in and collide with these membranes, the latter change their state of equil., their charge being neutralized by that of the ion of opposit sign, which again recovers its original charge from the H_2O. The neutral membranes are then in condition to again assume instantaneously the elec. colloidal state by the entrance of fresh amts. of H_2O into the capillary vessels, because the conc. of the electrolyte about them constantly varies. Non-dissociated organic compounds do not produce gelatinization because they cannot neutralize the elec. charges, but in the presence of electrolytes they exert a great influence on the gelatinization by increasing the osmotic pressure. Colloidal solns. of silicic acid and $Fe(OH)_3$ mutually ppt. each other without ever causing gelatinization; if the 2 are used in amts. inversely proportional to the valences of Si and Fe (*e. g.*, 12 cc. of 0.01 *N* SiO_2 and 8 cc. of 0.01 *N* Fe_2O_3), the pptn. is quant.; otherwise, that used in excess remains colloidally dissolved. In other words, while the 2 colloids can mutually neutralize their charges, their osmotic pressures are so small that they cannot cause H_2O to enter into the capillary vessels of each other, with consequent gelatinization. CHAS. A. ROUILLER.

The History of Colloidal Silicic Acid. P. WALDEN. Riga. *Z. Chem. Ind. Kolloide*, 9, 145–6.—A review of the work of the earlier investigators, J. C. F. Meyer (1775), J. H. Pott (1746), A. Baumé (1773), C. J. B. Karsten (1826), who explained phenomena on colloidal chemical conceptions. H. ISHAM.

Ultramicroscopic Observations of a Temperature Coagulation. T. SVEDBERG AND K. INOUYE. Upsala. *Z. Chem. Ind. Kolloide*, 9, 153–4.—An ether Pt soln. was placed in a carefully cleaned quartz chamber of the cardioid ultramicroscope, the cover made tight by a ring of Hg in the groove, and the no. of particles in the field of the microscope counted as the temp. was gradually raised. A sudden decrease in the no. of particles was noticed at 28–29°, which is in agreement with macroscopic detns. of the coagulation temp. H. I.

The Resistance between Metal and Crystal across Plane Surfaces. J. KOENIGSBERGER, O. REICHENHEIM AND K. SCHILLING. *Physik. Z.*, 12, 1139–42.—Streintz and Wellik (*C. A.*, 6, 24) had concluded that this resistance is variable and prevents

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the detn. of the sp. resistance of crystals. The authors reply that all metals are cryst. They give results, agreeing generally to 1% or better, obtained by several different kinds of contact, and agreeing equally well with results obtained by potential methods, where contact resistance was of course eliminated. They explain S. and W.'s results as due to flaws or inclusions in the crystals, and emphasize the care necessary to avoid such trouble. They recommend terminals of Au (untouched by Fe!), but Cu plating is also satisfactory. The crystal should be examd. optically and chemically, heated to 250°, when inclusions cause cracking, and tested in all directions for electrically insulating portions. A direct measurement of the contact resistance in 3 cases showed it to be but a few thousandths of the resistance finally measured. W. P. WHITE.

Electrical Conductivity and Chemical Reactions. G. REBOUL. Nancy. *Radium*, 8, 376–81.—It is usually considered that the ionization which accompanies chem. reactions is due to some concomitant physical phenomenon, as surface rupture, incandescence, luminescence, etc. Some expts. are described leading to a slightly different conclusion. In the mol. exchanges which constitute chem. action, some of the at. edifices may become changed, with coincident liberation of elec. charges. In order to test this hypothesis, certain reacting substances have been subjected to an elec. field and devices are described by which this field is augmented as much as possible. The ionization produced was measured both by the Curie electrometer and the Wilson electroscope. With K, kept at its m. p. and oxidized by moist air, the negative charge with a field of 50 v. is 25 times greater than the positive charge; with a field of 1000 v. it is 50 times greater and itself is increased 15 times. The slight splashing observed at the metallic surface is insufficient to explain the considerable emission of negative charges. The effect is largely due to the effect of water vapor, since with dry air it is considerably reduced. The results resemble those obtained by Haber and Just with liquid alloys (*C. A.*, 4, 141). The alkali metals and their amalgams also emit charges when exposed to the action of Cl or of Cl diluted with an inert gas so as to prevent ignition. The charges are much feebler than in the preceding case; the negative and positive charges are approx. equal, and they always increase with the el c. field. The cond. with a mixt. of air and NO is always greater than that with air alone even when the reaction is carried out in the absence of all metals except Pt. It is suggested that similar phenomena accompany all chem. reactions. A. T. CAMERON.

Number of Electrons Concerned in Metallic Conduction. J. W. NICHOLSON. *Phil. Mag.*, 22, 245–66.—An analysis of several recent speculative articles.
R. F. EARHART.

Refractive Index of Metals. P. A. ROSS. *Physic. Rev.*, 33, 549–56.—n from metallic prisms deposited by cathode discharge for red, yellow and blue. The following av. values are for Na light: Cu, 0.52; Fe, 1.85; Pb, 1.94; Pt, 1.76; Ag, 0.31; Zn, 2.11; Mg, 0.40; Au, 0.63; Bi, 1.95; Ni, 1.88. H. E. MERWIN.

Optical Constants of Alloys as a Function of Composition. J. T. LITTLETON, JR. *Physic. Rev.*, 33, 453–66.—The optical consts. of alloys of Fe-Ni, Ni-Si, Fe-Mn, Cu-Al, Cu-Ni, Cu-Fe were detd. by Drude's method. A linear change with change in proportions by vol. was found for the first 3 pairs; n has a max. and k a min. at 60% Al in the 4th; in the 5th and 6th n parallels the elec. cond. H. E. M.

Polymorphism and Molecular Orientations. M. BRILLOUIN. *Compt. rend.*, 153, 240–2.—Aragonite and calcite may be considered to be composed of like mols. differently oriented, parallel in calcite, oblique in aragonite. The stronger double refraction of calcite, and the similar values of the sp. refractions accord with this view.
H. E. M.

Fluorescence Microscope. K. REICHERT. *Physik. Z.*, 12, 1010–1.—For the

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study of substances, certain food products especially, which become fluorescent in ultraviolet light, the microscope can be provided with a quartz mirror-condenser and a source of ultraviolet light. H. E. M.

Certain Characteristics of Light-negative Selenium. L. B. CRUM. Univ. Iowa. *Physic. Rev.*, 33, 538–48.—This substance was found very uncertain, the resistance unsteady, affected by jars and temp. changes; the change on illumination was slight, under 1%, and easily changed in sign; the conditions for making it at all were not definitly detd. The excitation increases with intensity of light and with time, and is completed sooner with faint light. The recovery is quicker the less the light, the time, or the change in resistance. The effect is probably not due to impurity. W. P. WHITE.

Photo-electric Effect in Infra-red and Application of a Very Sensitive Potassium Cell. J. ELSTER AND H. GEITEL. *Physik. Z.*, 12, 758–61.—The authors use a cell with cathode of colloidal K and make it very sensitive by introducing a small amt. of He or A. The sensibility does not depend upon the thickness of the colloidal surface (for values greater than mol. thickness). The cell was placed in a light-tight sphere with an ebonite window through which infra-red rays were admitted. A potential of 180 v. is applied to the K and the small photo-elec. current measured by means of quadrant-electrometer and Bronson resistance, which is described in detail. The work points to the gradual falling off of the effect as wave length increases, but further research throughout the entire spectrum is necessary to det. the point. These cells are capable of making quant. measurements of the variation of light given out by phosphorescent bodies, and even the large light intensities (as from the sun) by using a portable galvanometer. D. W. CORNELIUS.

Initial Velocities of Photo-electrically Liberated Electrons. O. BAEYER AND A. TOOL. *Ber. physik. Ges.*, 1911, 569–72.—This work is an attempt to see if higher values can be obtained than Baeyer and Gehrts have previously observed (*C. A.*, 5, 1362) for the potential due to initial velocities of photo-electrically liberated electrons. When the Pt plate is made the anode, a very high value is obtained which decreases too rapidly with time to take the velocity curve. When a discharge is sent through the tube for a very short time a potential of 20 v. results. This decreases rapidly for a time then slowly until in 20 hrs. it has a value of 6 v. As might be expected, when the Pt plate is made the cathode the initial velocities are smaller. When both electrodes are of Pt there is no polarization. The polarization takes place almost entirely at the illuminated plate. The conclusion is that the very high velocities are due to a Volta effect between the electrodes. D. W. C.

Influence of Temperature and Magnetization on Selective Absorption and Fluorescence Spectra. H. DU BOIS AND G. J. ELIAS. *Ann. Physik*, 35, 617–8; see *C. A.*, 5, 2462. G. A. SHOOK.

Influence of Neutral Gases on the Absorption of Sodium Vapor. K. FREDENHAGEN. *Physik. Z.*, 12, 909–11.—The cond. of Na vapor in a Cl-H flame and a H flame is the same, whence the conc. of the ions in each case is practically the same. Since, however, the principal series of Na is produced only in the O flame, we may conclude that ionization is not the only detg. factor in light emission. If Na is vaporized in a vacuum tube and a neutral gas, such as H, N, CO_2 or He, is admitted, the intensity and breadth of the emission line is increased. In a previous paper it is shown that ionization also increases with the conc. of the neutral gas; whence, it is concluded that some relation must exist between ionization and emission. G. A. SHOOK.

Absorption of Long Wave-lengths by Gases. H. RUBENS AND H. VON WARTENBERG. *Ber. physik. Ges.*, 1911, 796–804.—Expts. are carried out on 22 gases to det.

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the absorption for 5 different wave lengths, 23μ to 31μ. The wave lengths were produced by means of the "Reststrahlen" from fluorspar, NaCl, etc., and by means of ray filters. An absorption tube containing the gas was placed between the light source and a radiomicrometer. A table gives the % of transmitted energy for each wave length used. No absorption was detected for H, CO_2, Br, and very little for Cl, CN, CS_2 and CO. G. A. S.

Absorption of Light by Fluorescein. K. KAEMPF. *Physik. Z.*, **12**, 761–3.—K. shows that within experimental error the absorption of light by fluorescein is independent of the intensity, *i. e.*, Lambert's law apparently holds for fluorescent substances. This result is not in agreement with that found by other investigators. G. A. S.

A Direct Measurement of the Velocity of Canal Rays in Hydrogen, and its Employment to Determin their Specific Charge. W. HAMMER. Freiburg. *Physik. Z.*, **12**, 1077–80; *Ber. physik. Ges.*, 1911, 955–60.—By means of electrostatic and magnetic fields and a vacuum of 0.00003 mm. Hg homogeneous bundles of rays were formed, whose velocity was detd. directly by the time required to pass from one to another of 2 crossed alternating electrostatic fields. The mean velocity was 251×10^6 cm./sec. and the important result was reached, in contradiction to J. J. Thomson, that the velocity is dependent on the potential. The ratio e/m was found by deflection in an electrostatic field to be 10040, which is only 3.6% out (as good as could be expected). H ats., H mols., and C ats. were all found in the original rays. With insufficient vacuum the velocities were not all the same, which is attributed to alteration of speed due to collisions. W. P. WHITE.

The Source of the Moving and of the Stationary Luminous Particles in Canal Rays. H. WILSAR. Würzburg. *Physik. Z.*, **12**, 1091–4.—When canal rays are observed end on, so as to show the Döppler effect, the spectral lines are seen undisplaced, as well as displaced, showing that some of the luminous atoms are at rest. Canal rays luminesce only by collision, and are dark in a vacuum. There was already some evidence that the moving atoms are always these originally in motion, *i. e.*, from the cathode, and that the stationary are those struck by them. This was definitly confirmed by generating the rays in one gas, and observing them when passed into another. The rays from near the cathode do not lose velocity appreciably by collision, and do not appreciably accelerate the atoms they strike. W. P. W.

Charges on Thermions Produced in Air and Hydrogen at Atmospheric Pressure. J. C. POMEROY. *Phil. Mag.*, **23**, 173–82.—Thermions from a heated strip were drawn into a uniform elec. field and their distribution studied. A freshly heated strip gives out positive ions having a double charge in considerable numbers. The proportion of double charged ions is a function of temp. and duration of heating. This is not true for the negative ions. R. F. EARHART.

Role Played by Gases in the Emission of Positive Thermions from Salts. CLINTON J. DAVISSON. *Phil. Mag.*, **23**, 139–48.—When an incandescent salt is emitting thermions, gases are given out at the same time. The accumulation of such gases affects the emission of thermions. The evolved gases from a blank Pt strip when heated, as well as the gas evolved when the incandescent salt was present, were collected, compressed in a capillary tube and examined spectroscopically by means of the electrodeless discharge. The gas accumulated was CO. The rate of evolution of CO and the effect of its presence on the thermionic current was studied under a variety of conditions. D. concludes that the CO or CO_2 which is emitted by samples of salts when heated is uncharged; that increase in thermionic emissions due to the presence of a gas in contact with the surface of an electrode is not due to an emission of gas atoms or molecules which have been absorbed by the salt and emitted in a charged condition. R. F. E.

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Positive Thermions from the Salts of the Alkaline Earths. CLINTON J. DAVISSON. *Phil. Mag.*, 23, 121–39.—The value of e/m for the positive ions emitted by heated salts was detd. by their deviation in a magnetic field. The values of the Ba salts, (sulfate, phosphate, fluoride and chloride) show large variations. Several salts of Sr, Ca, and Mg were also used. D. concludes that the positive thermions from the alkaline earths are single atoms of these elements minus electronic charges. R. F. E.

Variation with Distance of the Ionization Produced by Röntgen Rays. E. W. B. GILL. *Phil. Mag.*, 23, 114–21.—The intensity of the Röntgen rays was measured by their ionizing power at different distances from the origin of the rays. Within the limits of accuracy of the expt., the no. of ions produced is proportional to the inverse square of the distance. The result is in agreement with the corpuscular theory but does not contradict the ether pulse theory of the nature of such radiation.

ROBT. F. EARHART.

Ionization Produced by Carbon at High Temperatures. J. N. PRING AND A. PARKER. *Phil. Mag.*, 23, 192–200.—The leak from C in high vacuum has been studied at temps. up to 2050°. The negative ionization was found to fall continuously both with reduction of pressure and progressive purification of the C. The emission current is found to be of a much smaller magnitude than had been commonly supposed. Impurities in the C and reactions between the glowing C and residual gases play an important part in the total emission. ROBT. F. EARHART.

Spectrum of the Magnesium High Frequency Arc. ELLEN O'CONNOR. *Phil. Mag.*, 23, 94–101.—The spectrum of a high frequency discharge of undamped oscillations between Mg electrodes was examined by means of a Hilger spectroscope. Photographs between λ 4000 and λ 6570 were taken. Comparison was made with the direct arc and spark. Observations were made of the change in the appearance of the spectrum produced by change of frequency and by introducing capacity and inductance into the circuit. ROBT. F. EARHART.

The Effect of Very Short-waved Ultraviolet Light upon Gases. C. RAMSAUER. Heidelberg. *Physik. Z.*, 12, 997–8; *Ber. physik. Ges.*, 1911, 899–902.—A recapitulation of the main results of a series of researches of Lenard and Ramsauer, details of which have been published elsewhere. J. JOHNSTON.

Chemical Effect of Ultraviolet Rays. Synthesis and Decomposition of Water. I. I. ANDREEV. St. Petersburg. *J. Russ. Phys. Chem. Soc.*, 43, 1342–64.—Mixts. of H and O were exposed for different lengths of time and at different temps., to the action of ultraviolet rays of different intensities emitted by an Hg lamp, and the velocities of formation of H_2O detd. by measuring the variations in the pressure due to the diminution of the vol. The results show that under the action of light the velocity of the reaction is proportional to the intensity of the light, but is independent of the conc. of the reacting gases, the reaction being of the zero order: dx/dt = const. Since in the dark the reaction $2H_2 + O_2 = 2H_2O$ is of the 3rd order, A. assumes that the action of light is of a catalytic nature (cf. Plotnikov, *Photochemie*, 1910), producing some intermediate substance from the unavoidable impurities present in the H and the O. This substance is supposed to be formed quickly, but to decompose very slowly, so that for a given light intensity its conc. remains const. during the whole operation. The temp. coeff. of the reaction was found to be 1.1. By exposing steam to the action of ultraviolet rays and detg. the amt. of H_2O decomposed at temps. not exceeding 290°, the equil. of the reaction $2H_2O \rightleftarrows 2H_2 + O_2$ produced by light is different from that produced by heat alone at the same temp.; with an increase in the intensity of light the equil. is displaced in favor of the decomp. of the H_2O.

H. M. GORDIN.

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Stokes' Law and a General Relation between Absorption and Phosphorescence. L. BRUNINGHAUS. Faculté sci., lab. chim.-phys. *Radium*, 8, 411–5.—A discussion of previous work (see *C. A.*, 5, 3194). A. T. CAMERON.

A Monochromatic Temperature Radiation of Thallium Vapor. G. E. GIBSON. Breslau. *Physik. Z.*, 12, 1145–8.—Pure Tl was obtained by distillation *in vacuo* in a SiO_2 tube. The SiO_2 fixed the Tl_2O by forming non-volatil silicate. Inside a black body the Tl tube was invisible, though it showed a bright or reversed green line as soon as its temp. was made to differ from its background. Hence this monochromatic radiation is pure temp. radiation. W. P. WHITE.

The Line Spectrum of Nitrogen in Geissler Tubes. C. PORLEZZA. Ist. chim. gen., Univ. Pisa. *Atti accad. Lincei*, 20, 584–7, 642–5.—The wave lengths and intensities of some 56 lines between $\lambda\lambda$ 6610.06 and 4987.22 and of 109 lines between $\lambda\lambda$ 4895.17 and 3134.14 of the N spectrum under 100 mm. have been detd. to within about 0.05 Å. U. CHAS. A. ROUILLER.

Band Spectrum of Silicon Tetrafluoride. C. PORLEZZA. Ist. chim. gen. r., Univ. Pisa. *Atti accad. Lincei*, 20, 11, 486–90.—The wave lengths and intensitie of some 60 bands between $\lambda\lambda$ 5475.61–3870.75 have been detd. within 0.05 Å. U. C. A. R.

Luminescence of the Mercury Arc in Vacuum. A. PEROT. *J. physique*, 5, I, 609–26.—An experimental study was made of the behavior under widely varying conditions of the principal component (with its closest bright satellite) of the green line 5461 Å. U. in the vacuum Hg arc spectrum. Among the interesting points considered are (*a*) the appearance of the discharge as the pressure is varied, (*b*) elec. transport of Hg, (*c*) action of H_2O vapor, (*d*) velocity of the luminous centers, (*e*) potential gradient in the arc, (*f*) pressure excess at anode. The following conclusions are reached: (1) The emission of spectral rays by the corpuscular carriers of electricity is very slight if not altogether non-existent; (2) this emission is probably due to Hg atoms set in luminescent vibration by the elec. carriers; (3) the fall of potential across the arc has the effect of restoring the velocity of the carriers to its initial value, in spite of retarding impacts; (4) the energy of the luminous centers consists of 2 parts, the energy of translation and of radiation; the latter is not altered by the impacts.
L. H. ADAMS.

General Considerations on Emission and Absorption in Connection with the Question of the Measurement of Intensity in the Case of the Zeeman Effect. W. VOIGT. *Nachr. Ges. Wiss. Göttingen*, 1911, 71–97. J. J.

The Influence of Oxide Formation and Thermal Treatment on the Magnetism of Copper. FEODOR BEHNSEN. *Physik. Z.*, 12, 1157–60.—This investigation was undertaken to det. the real magnetic behavior of Cu and to see if the magnetic properties attributed to Cu by Gray and Ross (*C. A.*, 3, 1115) might not be due to the presence of impurities, especially since they conclude that electrolytic Cu cannot be permanently magnetized. Pure CuO and Cu_2O are not permanently magnetizable. Com. CuO may be permanently magnetized owing to small traces of Fe_2O_3 and therefore Cu obtained from com. CuO by reduction with H may be more strongly magnetized than the original CuO. With regard to induced magnetism electrolytic Cu is diamagnetic. Pure CuO and CuO_2 are paramagnetic. Cu obtained by reduction of com. CuO is more strongly paramagnetic than the original CuO. The results of Gray and Ross are probably due to the presence of Fe. J. L. CRENSHAW.

The Thermoelectric Behavior of Heusler Alloys in a Magnetic Field. L. O. GRONDAHL AND S. KARRER. Univ. Washington. *Physic. Rev.*, 33, 531–7.—The authors find, in contradiction to Guthe and Austin, that these alloys are affected by a longitudinal field similarly to Ni, Fe, and CO. Hence the results negative the supposition

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that the magnetic property of the alloys is different from that of Fe. No effect was found by similar treatment of Al and Zn, but further work will be done here. For very low fields the effect was found negative in Fe. In the alloys the max. effect observed for 3000 gauss was about 5 microvolts, which is nearly as great as in one sample of Fe, and about 10% of that in Ni. W. P. WHITE.

Electron Theory of Ferromagnetism. II. R. GANS. Physik. Inst., Tübingen. *Nachr. Ges. Wiss. Göttingen*, 1911, 118–64.—In the previous communication on this subject (*C. A.*, 5, 1868) equations were developed in which, however, the effect of temp. on the motion of elementary complexes was not considered; that is, the equations represent the course of the magnetization at the abs. zero. In the present communication formulas are derived, in which account is taken of the influence of temp. J. JOHNSTON.

Deflocculation (ACHESON). 4. Physico-chemical Volumetric Analysis (DUTOIT, WEISSE). 7. Variation of the Properties of Metals Produced on Working Them (TAMMANN). 9.

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3. RADIOACTIVITY.

HERMAN SCHLUNDT.

Madame Pierre Curie and her Work. B. SZILARD. *Chem. Ztg.*, 35, 1361–2.—Nobel prize winner for chemistry in 1911. E. J. C.

The Influence of Acids and Salts on the Amount of Emanation Liberated from a Solution of Radium. A. S. EVE AND D. MCINTOSH. McGill Univ. *Trans. Roy. Soc. Can.*, 1910, 4 (Sect. 3) 66–8.—Ba salts reported to be chemically pure were tested for their Ra content. The results are expressed in 10^{-12} g. Ra per g. salt: $BaCl_2$, 2.84; $Ba(OH)_2$, 0.11; $Ba(NO_3)_2$, 0.36. These substances contain therefore about as much Ra as many rocks or soils, and great care is necessary in measuring minute quantities of Ra in the event of chem. treatment with a Ba salt. Certain ppts. appear to occlude Ra and in that way to check the escape of Nt. Thus a soln. of $RaBr_2$ in 220 cc. water, containing a trace of HCl, liberated 100% Nt, while another to which 10 cc. 10% $BaCl_2$ and 1 cc. H_2SO_4 were added liberated only 13%. A. T. CAMERON.

A Variation in the Intensity of the Penetrating Radiation at the Earth's Surface Observed during the Passage of Halley's Comet. ARTHUR THOMSON. *Trans. Roy. Soc. Can.*, 1910, 4 (Sect. 3) 61–5.—With the ionization vessel used about 30 ions per cc. per sec. were observed normally. Two remarkable increases were observed, one on May 19th, 1910, lasting from 1 to 4 P.M., the second on May 21st, from 9.30 to 11 A.M., when the ionization rose to about 100 and 130 ions per cc. per sec., resp. This increase is attributed either to some intense temporary solar activity or to the passage of the comet. In the former case a repetition of the disturbance should be expected. None such occurred during measurements made over the 4 days May 23rd to 26th. A further series of measurements is contemplated over a longer period of time in order to decide the question finally. A. T. CAMERON.

The Amount of Radium and Radium Emanation Present in the Water and Gases of the Caledonia Springs, near Ottawa. A. S. EVE. McGill Univ. *Trans. Roy. Soc. Can.*, 1910, 4 (Sect. 3) 53–4.—The amt. of Ra present in terms of 10^{-12} g. per l. is, for "Gas Spring" 15, "Sulphur Spring" 15, "Saline Spring" 14, "Artesian Sulphur Spring" 10, "Duncan Spring" 18 (compare sea-water 0.9). With the same unit the amt. of Ra in equil. with the Nt present in a l. of gas from the springs is for the "Gas Spring" 620, for the "Duncan Spring" 420, the "Saline Spring" 210; and for atm. air

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at Montreal 0.1 so that the gases contain about 4000–6000 times as much Nt as the atm. A. T. CAMERON.

The Radium Contents of Specimens from a Deep Boring at Beachville, Ontario. A. S. EVE AND D. MCINTOSH. McGill Univ. *Trans. Roy. Soc. Can.*, 1910, 4, 69–70.—Specimens were taken at 8 different depths of the boring the least being 30 ft., the greatest 2580 ft. Each specimen of 15 g. was fused with fusion mixt. and then leached with small quantities of water so that 2 portions were obtained. The insol. invariably contained more Ra, on the av. about 4 times as much. There was no definit relationship between depth and quantity of Ra. The mean values obtained agreed well with those found by the authors and by Strutt. The extreme total values found per g. rock were 0.50×10^{-12} g. Ra at 870 ft., and 1.42×10^{-12} at 1620 ft. A. T. CAMERON.

The Specific Charge of Slow Cathode Rays. A. BESTELMEYER. Göttingen. *Physik. Z.*, 12, 972–5; *Ber. physik. Ges.*, 1911, 984–9.—In 1907 B. using a transverse elec. field obtained for e/m the value 1.73×10^{-7}, which was considerably smaller than the value accepted at that time (1.87×10^{-7}). Since, the other authors have united in finding that the early value is too high. B. now using a longitudinal elec. field in combination with a transverse magnetic field, from a series of detns., obtains the value 1.766×10^{7}, or when corrected for retardation, 1.75×10^{-7}. J. J.

Radioactivity of Certain Russian Mineral Springs. P. G. MEZERNITZKII. *J. Russ. Phys. Chem. Soc.*, 43, 244–55; through *J. Chem. Soc.*, 100, II, 960.—M. has examd. electrometrically a number of mineral waters from various parts of Russia, all of which exhibit radioactivity, some of them to a greater degree than the waters of Carlsbad, Marienbad, Nauhein, Gastein, etc. E. J. C.

Bearings of Radioactivity on Geology (CHAMBERLIN). 8.

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4. ELECTROCHEMISTRY.

C. G. FINK.

An Electric Laboratory Furnace. R. C. BENNER. *J. Ind. Eng. Chem.*, 4, 43.—The "Nichrome" elec. furnace is the most economical and convenient lab. furnace for obtaining a temp. of 1100°. The high resistance of the wire makes it possible to use 110 or 220 v. without any extra resistance in the circuit. The 2 types in general use are the crucible and muffle type, both of which are made in the same general way. The av. cost of a furnace is $2.00; when used on a 110 v. circuit, with elec. at 10 c. per kw. hr., the muffle furnace, which takes 5 amps. can be operated at a cost of 5 c. per hr. and the crucible furnace, which takes 3 amps., will cost 3 c. per hr. There is no loss of Pt from the crucible due to impurities in the gas. G. F. YESSLER.

An Unsuccessful Furnace Experiment. F. A. J. FITZGERALD. *Trans. Am. Electrochem. Soc.*, 20, 281.—Correction for *C. A.*, 6, 28. In one of the furnaces the walls were partly covered with brick having high insulating properties and while this only covered 25% of the total exterior of the furnace, the heat losses were materially reduced. L. K. MULLER.

The Electric Furnace for Small Steel Castings. ANON. *Met. Chem. Eng.*, 10, 54–5.—The advantages of the elec. furnace are high temp. and the abs. control of the %'s of the elements which go to make up good steel. Elec. furnace steel can be made with any C content. P and S can be reduced to 0.01–0.02%. G. F. YESSLER.

Engineering Features of Electric Furnaces. C. HERING. *Eng. Mag.*, 42, 540–8; *Eng. News*, 62, 56–60.—A description of the general characteristics and properties of the various types of elec. furnaces. C. N. MOORE.

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The Electric Reduction of Iron Ores. O. FRICK. *Met. Chem. Eng.*, 9, 631–7; *Elec. World*, 58, 1432.—A discussion of the general features of elec. ore reduction with special reference to the electro-metals furnaces at Trollhättan, Sweden, and the Noble Furnace at Héroult, California. By eliminating the H_2O from the circulating gas, the coal consumption can be reduced by about 14% or 5.76% in power consumption. The use of burnt CaO instead of limestone will secure a further economy of 3.18% as there will be less CO_2 in the gas, which thereby will become more strongly reducing. By heating the charge outside the furnace to evap. the H_2O, 62 kw.-hrs. per ton (2.58%) of pig may be saved. The total av. saving thus possible amts. to 293 kw.-hrs. per ton (12.15%) of pig. Further savings in power are possible by reducing the dimensions of the furnace as much as possible and by always running the furnace at full load. A small saving may also be secured by preventing the air from entering into the furnace. The av. amt. of air per ton of pig has been approx. 45 kg., burning 6 kg. of charcoal and producing 25 kw.-hrs. If provisions were made to obtain all the savings possible, the following result would have been obtained: The av. coal consumption would have been 360 kg. instead of 418 kg. per ton of pig, and probably still lower, as a greater part of the ore would most likely have been reduced by CO on account of the stronger reducing action of the gases. The av. power consumption would have been 1,985 kw.-hrs. Even still better results may be anticipated because of the saving in power consumption through the stronger reducing capacity of the gases.

W. E. RUDER.

Deflocculation of Artificial Graphite. E. G. ACHESON. *Chem. Eng.*, 14, 501; *J. Ind. Eng. Chem.*, 4, 62; *Engineering*, 92, 673; *J. Soc. Chem. Ind.*, 30, 1426–9; *Eng. News*, 66, 677.—A. performs a few expts. with clay and graphite. Clay is deflocculated by agitation in an aq. soln. of tannin, next NaCl is added, which ppts. or flocculates the clay. To obtain deflocculated graphite, artificial graphite is ground to such a fineness that it will pass through a sieve having 40,000 meshes per sq. in., and then is masticated with a soln. of tannin (about 5% of the wt. of graphite) or extracts of straw, tea infusions, etc. Deflocculated graphite is also flocculated by addition of acid. Substances deflocculated: Artificial graphite, natural graphite, amorphous SiO_2 and Al_2O_3, lampblack and siloxicon (SiC_2O). Organic washes which will cause deflocculation are solns. of tannin, or organic substances containing tannin, solns. of the gum of the peach and cherry tree, extracts from straw and grass and from barnyard offal. Flocculating agents: electrolytes. Recent microscopic exam. shows deflocculated graphite (oildag, aquadag) to be a true colloid. A. is of the opinion that the subdivision of the particles stops short only of mols.

C. H. ELDRIDGE.

Electrodeposition of Cadmium. E. BLASSET. *Metal. Ind.*, 9, 509–10.—Cd is deposited from a cold soln. of 5 oz. of KCN and 1.7 oz. of $CdCO_3$ in 1 gal. H_2O, with a current pressure of 2 v. The $CdCO_3$ should be freshly ppted. from a soln. of $CdSO_4$ in H_2O or Cd in HNO_3. The deposit is white and soft and may be given a high polish which it retains about equally as well as Ni. It may be plated directly onto steel and Fe where it is more rust proof than Ni or Sn and equal to an electro-zinc plate. Good antique finishes may be obtained and the surface may be oxidized in a black Ni soln., but not in an As and S dip.

C. N. MOORE.

Treatment of Sulfated Storage Cells. G. A. PERLEY. *J. Physic. Chem.*, 15, 489–507.—For restoring cells whose plates are covered with $PbSO_4$ to normal capacity, charging and over-charging are inefficient because of the resulting loss of material from the plate. As the addition of Na_2CO_3 to the electrolyte had been also proposed, P. investigated this field and found that sulfated cells can be brought to their original capacity by charging in NaOH soln. In practise, Na_2SO_4 soln. is used; this tends to form NaOH at the cathode, thereby reducing the $PbSO_4$. The best conditions are

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secured by charging for 60 hrs. at the normal rate in a soln. of about 200 g. pure Na_2SO_4. $10H_2O$ per l. It need not subsequently be washed completely from the plates.

G. R. FONDA.

Apparent Difference of Potential between Metal and Electrolyte. J. GUYOT. *Compt. rend.*, 153, 866–9.—If a metal gauze is placed above a soln. which is connected to an electrometer by means of a reversible electrode and the air in between ionized by exposure to a prep. of polonium, an e. m. f. is established which can be measured with respect to the + or — ions of the soln. Solns. of $AgNO_3$, $CuSO_4$, HCl, KCl, NaCl, LiCl and NH_4Cl were examd. and the e. m. f. found to vary linearly with the logarithm of the conc. The coeff. of the potential with increase in conc. varied from ± 0.0524–0.054.

G. R. FONDA.

Formation of Hydrogen Peroxide under the Electric Discharge. A. BESSON. *Compt. rend.*, 153, 877–9.—The discharge chamber was cooled to several degrees below zero and the pressure varied from 30 to 760 mm. As a test for H_2O_2, B. used the blue coloration obtained with CrO_3; that obtained with KI is produced by the presence of O_3 also. With H_2O vapor alone, no H_2O_2 was found. In O and H_2O vapor it was always found except at extremely low pressure; it was particularly strong in an excess of O at pressures of $^1/_2$–1 atm. In air and H_2O vapor its formation was proved with difficulty, owing probably to the action of N oxides. Here too the strongest test was found in an excess of air. As the conditions of cooling, low pressure and excess of O are met at high altitudes, B. believes that the appearance of H_2O_2 in rain is due to elec. phenomena in air.

G. R. FONDA.

European Apparatus and Processes for the Manufacture of Electrolytic Hypochlorite. JOHN B. C. KERSHAW. *Elec. World*, 58, 1005–7.—A review.

R. W. MOORE.

The Electrolytic Disintegration of Concrete Structures. W. HEYM. *Elektrochem. Z.*, 18, 214–49.—A review. Various methods of protecting Fe are discussed. Painting with Al paint is recommended.

W. E. RUDER.

A Bismuth-Silver Thermopile. W. W. COBLENTZ. *J. Frank. Inst.*, 172, 559–68.—Ag wire 0.051 mm. in diam. and Bi wire 0.1 mm. in diam. are welded by means of a small bead of Sn. The length of the receiving surface of the pile, consisting of 20 junctions, is 12 mm. and the width 1.3–1.4 mm., made wide to give high sensitivity. The thermoelec. power is 89 microvolts per degree, as compared with an Fe constantan couple of 51–53 microvolts, the temp. sensitivity of Bi-Ag being therefore about 74% greater than Fe. The Bi-Ag thermopile has a resistance of 9.3 ohms. The radiation sensitivity is about 2.6 times as great as the ordinary Rubens Ag pile, and 3 times the new fine wire type of Fe constantan pile. Temp. equil. is attained in less than 4 sec.

A. S. EASTMAN.

The Fixation of Atmospheric Nitrogen. M. W. FRANKLIN. *Chem. Eng.*, 14, 453–6.—Historical description of the sources and utilization of N. The app. and methods now used are described.

G. F. YESSLER.

Electric Arc and Lighting by Arcs. ELIHU THOMPSON. *Gen. Elec. Rev.*, 14, 575.—Short, popular article.

C. W. HILL.

Design of Luminous Arc Lamps. C. A. B. HALVORSON. *Gen. Elec. Rev.*, 14, 578.—Essential features:—Arrangement of negative magnetite electrode below large Cu positive electrode, mechanism by which electrodes are held apart when current is off and are struck forcibly together when current is turned on, maintenance of const. arc length, central chimney for removal of fumes from arc, lamp mechanism of starting and shunt coils, series resistance, cutout, and dashpot. The light is pearl-white and of high efficiency.

C. W. HILL.

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Absolute Measurement of the Ampere. E. GEHRCKE AND M. v. WOGAN. Charlottenburg. *Ber. physik. Ges.*, 1911, 470–3. L. H. ADAMS.

Theory of the Mercury Arc Rectifier. W. R. WHITNEY. *Gen. Elec. Rev.*, 14, 619–21.—A description of the phenomena which take place in a rectifier tube showing plainly how the a. c. is changed into d. c. The fact that the current is carried by a stream of negatively charged particles of Hg in the rectifier and the consumption of the cathode if it is made of graphite or Fe is cited as indication of a direction of flow of something material when elec. energy is being transported. C. N. MOORE.

Constant Current Mercury Arc Rectifier. C. M. GREEN. *Gen. Elec. Rev.*, 14, 621–6. C. N. MOORE.

Miscellaneous Lamp Characteristics. M. TAPPLEY. *Elec. Rev. West. Elec.*, 59, 528.—The working life of gas mantles is 350 hrs., for C filament lamps 800–1000 hrs., and for metal filament lamps 1200–2000 hrs. Gas mantles fall to 80% in about 100 hrs.; C and flaming arc lamps are free from any decadence in c. p. With open arcs only 10–15 burning hrs. are obtained. The Cooper-Hewitt Hg arc lamp falls to 75% c. p. in 1000 hrs. owing to a gray film deposit inside the tube, although the quartz type has a guaranteed life of 1000 hrs., without appreciable deterioration. The Moore lamp does not blacken appreciably. W. lamps are the least susceptible of all incandescent lamps to voltage fluctuation. Arc lamps do not require as close a regulation but excessive pressures must be avoided as the automatic feeding coils give long unstable and inefficient arcs. T. compares the power factor of filament lamps which is practically 100% with that of the arc lamps which is 80–90% and the Moore tube which is 90%. P. DORTICOS.

A Registering Carbon Filament Electrometer. M. P. VILLARD. *Compt. rend.*, 153, 315–8.—An electrometer was desired of small vol., steady enough to be used in a balloon and of such sensibility as could be regulated as desired. A modified Hankel electrometer was adopted, in which a C filament in the form of a U is allowed to oscillate freely between 2 plates having a potential difference. Registration is secured by the reflection from a silvered glass capillary fitted onto the tip. The displacements are about 2 mm. to each side of the zero mark. Variation in sensibility is secured by varying the size of the filament, attaching to the tip a band of Al, altering the distance between the plates and varying the voltage across the plates. G. R. FONDA.

Vacuum Oscillation Valves. R. S. WILLOWS AND S. E. HILL. *Electrician*, 68, 302–3.—The Fleming valve, which allows the passage of the — phase of an oscillating current, consists of an incandescent C filament surrounded by an insulated metallic cylinder both enclosed in an evacuated vessel. The emission of ions from the filament allows the current to pass in 1 direction only between the 2. W. and H., by increasing the emission of ions, were able to secure greater sensitivity of the app. They substituted for the C filament a strip of Pt coated with lime and for the cylinder, a 2nd strip of Pt coated with Al phosphate. Each, when hot, emits ions profusely, — in the 1st case, + in the 2nd, thus securing a stronger rectifying action. On increasing the e. m. f. of a polarizing battery, the current passed by the valve decreases at first and then still further increases. G. R. FONDA.

The Resistivity and Thermoelectricity of Tantalum. H. PÉCHEUX. *Compt. rend.*, 153, 1140.—P. finds the resistivity of pure Ta corresponds with the formula $\rho t = 16.38\ (1 + 0.0025t + 0.0000004t^2)$. The resistivity of Ta increases with the purity as does also the temp. coeff. The thermoelec. power of Ta compared with pure Pt is given in the following formula: $dE/dt = 2.20 + 0.024t$. The thermoelec. power increases with the purity of the metal. Annealing also increases the value. This formula was derived from the purest sample examd. which however contained

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some traces of C. This sample was found to lie between Pd and Pt-Rh (10% Rh) in the thermoelec. scale. Nb was found in the Ta as a slight impurity.

W. E. RUDER.

Iron-free Copper Wire. W. VOLKMANN. *Elektrochem. Z.*, 18, 250.—V. points out the difficulty of procuring com. Cu wire that is suitable for fine galvanometer work owing to the presence of small quantities of Fe. Ordinary electrolytic Cu is not free from Fe, but can be made so if sufficiently low c. d. is used in depositing Cu from a well agitated soln. Fe is also introduced into otherwise pure Cu, by drawing through steel dies. W. E. RUDER.

Examination and Tests of Rubber-covered Wire. H. T. WREAKS. *Elec. Rev. West. Elec.*, 60, 84.—To bring about the adoption of uniform specifications a merger of the Wire Inspection Bur., Nat. Elec. Code Rubber-covered-wire Service and the Underwriter's Labs. has been brought about. All changes in specifications and procedure are to be in the hands of a committee. The 1911 Natl. Elec. Code Specifications are adopted, calling for a series of elec., physical, and chem. tests on new wire, wire after aging, and wire bought in the market; analysis of results every 3 months; detn. for given periods of samples falling below certain specified limits and refusal of label to manufacturers whenever the total amt. of demerits recorded against any product for specified periods amounts to or exceeds the limits established. Chicago and N. Y. City have already adopted this system. C. N. MOORE.

Duddell-Mather Wattmeters. 1. Machine for the Demonstration of Alternating Current Phenomena (GLATZEL). 1.

U. S., 1,015,439, Jan. 23. A. HELFENSTEIN. **Smelting furnace with electric refining hearths.**

U. S., 1,015,546, Jan. 23. W. H. DAVIS. **Electrolytic cell.**

U. S., 1,015,598, Jan. 23. F. J. TONE. **Silicon carbide in the form of cut and polished crystals for use as light-refracting material.**

U. S., 1,015,734 and 1,015,735, Jan. 23. R. V. HEUSER. **Primary batteries.**

U. S., 1,015,891, Jan. 30. K. IKEDA and S. SUZUKI. **Separating glutamic acid and other products of hydrolysis of albuminous substances from each other by electrolysis.**

U. S., 1,016,097, Jan. 30. C. C. RUPRECHT. **Purifying electrically conductive substances by centrifugal action and an electric current.**

U. S., 1,016,804, Feb. 6. C. H. WEBER. **Tungsten filament containing a small amount of tellurium.**

U. S., 1,016,874, Feb. 6. T. A. EDISON. **Preventing depletion of electrolyte in secondary batteries.**

U. S., 1,016,875. Feb. 6. *Idem.* **Electroplating apparatus.**

Ger., 230,139, Mar. 10, 1909. SIEMENS-SCHUCKERT WERKE. **Arc lamp for pulverulent or liquid fuels.**

Ger., 230,589, June 5, 1907. H. H. HATFIELD and FR. M. LEWIS. **Arc lamp in which the arc burns in a closed room with use of carbons contg. metallic salts.**

Ger., 230,686, Nov. 12, 1900. FABRIK ELEK. ZÜNDER. In the manuf. of **electric filaments**, the metal forming the filament is pptd., in certain cases by the aid of a metal easily sol. from the cathode, as Cu, Ni, or Ag, in a very fine layer simultaneously with inert substances in such manner that it can be easily drawn off as a thin sheet satd. with inert substances from the cathode. The sheet is divided into fine strips

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of the required length forming the filament, the proportion of width to thickness of strip being detd. according to candle power, probable life of the strip, and necessary degree of solidity, the strip being preferably made as wide as possible and thin, providing it with fine slots, holes, or pores.

Ger., 230,687, Jan. 22, 1910. K. SCHRÖTER. **In the manuf. of electric metallic filament incandescent lamps, expelling the auxiliary metal and impurities from the filament by heating on the finishing bearing frame, the latter being provided with a sol. layer which is removed after adjusting the filament thereon and removing the impurities or auxiliary additions, the ppts. on the protective coating being also removed.**

Ger., 230,688, Oct. 5, 1909. WESTINGHOUSE ELEC. CO. **Electric heater in which the heating resistance is connected with a metallic body expanding under the influence of its heating and then indicating temp. and regulating it.**

Ger., 230,736, June 23, 1910. F. GRASSES. **In a glass container for mercury-carbon filament lamps, the lower part is drawn out in such manner that the drop of Hg is always in the lowest pt. opposit to the reënforced part of the loop of the C filament.**

Ger., 230,768, Nov. 3, 1907. Addition to 153,328. SIEMENS & HALSKE. **Manuf. of electric incandescent lamps with metallic filaments. Several sections of filaments switched in series are connected by a hook arranged on the end of a single bearing arm.**

5. PHOTOGRAPHY.

LOUIS DERR.

Sulfide Toning of Printing-out Paper. H. JEFFREYS. *Brit. J. Phot.*, 58, 759–60, 775–7.—Tabulated results are given of experiments in toning with Na_2S, tri- and tetra-thionate, thioantimoniate, thiostannate, thiomolybdate and thiotungstate. The thiotungstate and thiomolybdate methods give permanent results, are the best of the above, and are comparable with the Au method. L. DERR.

Reversal and Re-reversal. J. STERRY. *Brit. J. Phot.*, 58, 820–1.—Reversal cannot be considered as a simple periodic change due to the action of light, but is rather due to secondary reactions; though a fixed point under similar conditions, it is readily shifted by change of developer or plate. Re-reversal, so far as that which cannot be developed is concerned, appears to be due to the direct action of light giving a visible image without development. L. DERR.

The Action of Light and Development. J. STERRY. *Brit. J. Phot.*, 58, 821–3.—The amount of Ag reduced by development does not necessarily indicate the relative amounts of light-action on the plate, and the final result must be considered as due to the combined action of exposure and developer. There are indications that the action of light is to produce (1) a product which is untouched by weak oxidizing agents and answers to the molecular theory of the latent image, (2) a product whose development is prevented by oxidizing agents, answering to the sub-halide theory, (3) a distinct reduction which is not removed by the fixing bath. Thus two latent images may be formed, and the reduction with a dilute developer appears to be from the first or primary latent image, while the rich and slightly alkaline ordinary developer gives reduction mainly from the secondary image. The form of the characteristic plate curve is shown to be in accordance with this hypothesis. L. DERR.

Reversed Negatives Direct by Development after Fixing. A. LUMIÈRE, L. LUMIÈRE AND A. SEYEWETZ. *Brit. J. Phot.*, 58, 851–2; see *C. A.*, 6, 328. L. D.

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Combined Development and Fixing. V. CREMIER. *Brit. J. Phot.*, 58, 915–8, 931–5.—An assembling of past and present formulas for a process which is at present unsatisfactory. The addition of hypo to diaminophenol produces a strong restraining action, without fog. L. DERR.

Dye Toning of Positives on Glass. L. LEMAIRE. *Brit. J. Phot.*, 58, 969–71.—A dichromated gelatin plate is exposed behind a negative, the dichromate washed out, and the plate immersed in the dye. A table of 71 dyes is given, showing their comparative availability. Those recommended are lanafuchsin 6B, and lanafuchsin brillante SL; blue, "cyanol d'alizarin BF breveté;" yellows, "jaune solide 2 GL," and quinoline yellow; greens, "vert naphthol and vert brillante d'alizarine;" violet, violet lanacyl B; all Casella dyes. L. DERR.

Lumière Quinone Reducer. E. STENGER AND H. HELLER. *Brit. J. Phot.*, 58, 988–9; cf. *C. A.*, 5, 3016.—Like the persulfate reducer, when made up with dist. water it gives reduction proportional to the deposit. A surface reduction is favored by short time of action, increase of H_2SO_4, and very markedly by addition of chlorides. L. DERR.

So-called Repeated Reversal of Solarization. A. P. H. TRIVELLI. *Phot. Korr.*, 58, 620–4.—A criticism of observations of H. Lüppo-Cramer. There is nothing to disprove the theory of the existence of several sub-halides. Two solarization reversals are known, the second showing under the microscope a structure quite different from the first. L. DERR.

Alteration of Dyes in Light. K. GEBHARD. *Phot. Korr.*, 58, 634–7; cf. *C. A.*, 6, 155.—Methylene blue in presence of glycerol or HCHO bleaches rapidly in sunlight and still more rapidly if at the same time *in vacuo*. The action is a reduction by the glycerol, which is not reversed by a reoxidation in the dark. Bleaching of triphenylmethane dyes in presence of anethole and air is due to simultaneous condensation and oxidation, the condensation being hindered by O. L. DERR.

Behavior of the Latent Image toward Hypo. H. LÜPPO-CRAMER. *Phot. Korr.*, 58, 570–4.—The action of 2% and 20% hypo baths on the latent image is practically the same, provided that the duration of fixing is only long enough in each case to dissolve the Ag. For development after fixing, an exposure at least 20 times normal is necessary. L. DERR.

Pinatype. A. STÜRAL. *Phot. Korr.*, 58, 609–20.—Working directions, including a description of a new automatic camera for making the 3 exposures in quick succession without manipulation. L. DERR.

Relief Obtained on Negatives by Hydrogen Peroxide. H. LÜPPO-CRAMER. *Phot. Korr.*, 58, 608–9.—The addition of KBr to the solution delays the dissolving of the Ag, but accelerates that of the gelatin. L. DERR.

Determination of the Melting Point of a Gelatin Jelly. C. W. GAMBLE. *J. Municipal School of Technol., Manchester*, 4, 115–9 (1911); *J. Soc. Chem. Ind.*, 30, 1324.—The author has been able to obtain satisfactory results in the detn. of the m. p. of gelatin jellies by a capillary tube method. The capillary tube is half filled with a warm gelatin soln., of the desired conc., containing a small quantity of thymol as an antiseptic, and is then kept under a bell jar until complete setting of the jelly has taken place; a vessel of water is also placed under the bell jar to prevent drying. The capillary tube is then attached to a thermometer in the usual manner and heated in a water bath. The temp. at which the concave meniscus disappears is taken as the m. p.; 6 successive detns. are made with each sample, the first result being rejected, and the mean of the remaining 5 taken as the true value. Jellies of high concs. give less con-

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cordant results than those of lower concs. A conc. of 5 g. per 100 cc. is recommended for the class of gelatin usually employed for photographic purposes. J. J. M.

U. S., 1,013,458, Jan. 2. J. H. SMITH and W. MERCKENS. **Bleach-out process of color photography.**

U. S., 1,014,970, Jan. 16. A. W. MCCURDY. **Making a photographic "positive-negative."**

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6. INORGANIC CHEMISTRY.

H. I. SCHLESINGER.

Recent Work in Inorganic Chemistry. J. L. HOWE. *J. Am. Chem. Soc.*, 34, 147–61.—A review for 1911. E. J. C.

Zinc Hydrogen Carbonate as an Impurity in Sodium Hydrogen Carbonate. A Non-poisonous Mouse Poison. K. SCHERINGA. Nigkerk. *Pharm. Weekblad*, 48, 1353–4. V. E. HENDERSON.

Fractional Crystallization of the Picrates of the Rare Earths. L. M. DENNIS AND C. W. BENNETT. Cornell Univ. *J. Am. Chem. Soc.*, 34, 7–10.—Rapid conc. of Pr and Nd practically free from Er and Hm and of Er and Hm with relatively small amts. of the didymium earths is effected. Rare earths, freed from Ce till H_2O_2 gives no test, disclose further amts. of Ce upon soln. of the hydroxides in picric acid. A. R. MIDDLETON.

The Electrochemical Oxidation of Some Hydrazine Salts. J. W. TURRENTINE AND W. A. GIBBONS. Wesleyan Univ. *J. Am. Chem. Soc.*, 34, 36–49.—Under conditions favoring formation of percarbonate from $N_2H_4.H_2CO_3$, only N_2H_4 was oxidized. $N_2H_4.2HCl$ and $N_2H_4.2HBr$ yield only N_2 and H_2O, or these with NH_3 according to conditions. A. R. MIDDLETON.

Action of Ammonia upon Ammonium Thiocyanate. W. P. BRADLEY AND W. B. ALEXANDER. Wesleyan Univ. *J. Am. Chem. Soc.*, 34, 15–24.—NH_4SCN deliquesces in NH_3 up to 88°. The f. p. curve was detd. for solns. of NH_4SCN in NH_3 from 0–100% NH_3. $NH_4SCN.NH_3$, m. p. —16°, $NH_4SCN.3NH_3$, —38°, $NH_4SCN.8NH_3$, —87°, were indicated certainly. $NH_4SCN.7NH_3$, —84°, and $2NH_4SCN.13NH_3$, —80° probably were formed. The lowest eutectic is near —96°. A. R. MIDDLETON.

The Formation of Lead Carbonate from Metallic Lead in the Presence of Metallic Aluminium. C. REICHARD. *Pharm. Zentralhalle*, 52, 1395–6.—Pb and Al plates when in contact and exposed to moisture and CO_2 were attacked, and the coating on Pb found to consist of the carbonate and the acetate. The Al plate was found attacked only at certain points from which it was concluded that the Pb is oxidized first, and the Pb compds. formed act on the Al, the galvanic action assisting the reaction. A. VORISEK.

A Compound of Ferric Sulfate and Alcohol. Constitution of Ferric Sulfate. A. RECOURA. *Compt. rend.*, 153, 1223–6.—When the white $Fe_2(SO_4)_3.9H_2O$, which is very slowly sol. in EtOH and according to Wyrouboff has the constitution $Fe_2(OH)_6.3H_2SO_4.3H_2O$, is heated for a time at 100° it loses $6H_2O$ and is transformed into the yellow $Fe_2(SO_3)_3.(OH)_6$ which is immediately sol. in EtOH. This product should not be regarded as a salt, but rather as a hydroxide containing a complex radicle. Two of the OH groups are acidic, and 2 others are analogous to the alcoholic OH groups. Thus ferrisulfuric acid has the constitution $(Fe_2(SO_3)_3)O(OH)_4H_2SO_4$. A 0.01 *N* alc. soln. of $Fe_2(SO_3)_3(OH)_6$ when treated with a 0.1 *N* soln. of $BaCl_2$ fails to give a ppt.

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When the alc. soln. of $Fe_2(SO_3)_3(OH)_6$ is evapd. in a vacuum a yellow solid is obtained containing alc. of constitution, and having a comp. and constitution represented by the formula: $Fe_2(SO_3)_3(OH)_4(OC_2H_5)_2$. When this compd. is heated, it loses 1 mol. of H_2O at 105°, without any change in appearance. The other mol. of H_2O leaves with the alc. at 115°, the substance at the same time becoming black and yielding the odor of caramel. At higher temp. the black color disappears, and anhydrous $Fe_2(SO)_3$ is left. When the $Fe_2(SO_3)_3(OH)_4(OC_2H_5)_2$ is dissolved in H_2O, the alc. is liberated.

EDW. WOLESENSKY.

Formation and Decomposition of Anhydrides. MARCEL GUICHARD. *Compt. rend.*, 153, 1226–9.—A method is described for the detn. of the decomp. temp. of substances which yield gaseous products. The substance is heated at a const. temp. in an all-glass app. fitted with a MacLeod gage, and the extent of decomp. is detd. from the change in pressure. I_2O_5, after being dried in air at 200°, undergoes practically no decomp. in a vacuum at 200°. At 250° the deconp. is very slight. To obtain anhydrous I_2O_5, G. recommends heating it in a vacuum at 250° for 100 hrs. E. W.

Deflocculation (ACHESON). 4.

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7. ANALYTICAL CHEMISTRY.

E. G. R. ARDAGH.

Mechanical Organization of Analyses with the Purpose of Increasing their Exactitude and Rapidity for Commercial Needs. C. H. AND N. D. RYSDALE. *Rev. métal.*, 8, 640–4. E. J. W.

The Indirect Methods of Analytical Chemistry. JUAN FAGES VIRGILI. *Rev. real acad. cien., Madrid*, 9, 83–126, 219–48.—The author considers the case of the detn. of 2 components only, using numerous analytical methods of the following 3 types as illustrations: Methods (1) by difference ($x + y = P$ and $y = P'$), (2) by the collective measurement of 2 different magnitudes of the same fundamental property ($x + y = P$ and $(x \pm n) + (y \pm n') = p'$, n and n' being the resp. values of the variation of the property for each substance), and (3) the successive measurement of 2 distinct properties common to the 2 substances ($x + y = P$ and $Kx + Ky' = P'$, K and K' being the ratios of the magnitudes of the 2 distinct properties for the resp. substances). A consideration of the errors inherent in indirect methods leads to the following conclusions: The precision of a method, other things being equal, is proportional to the value of $K—K'$ (methods in which $1/(K—K')$ is greater than unity should generally be considered inadmissible). The greatest precision is therefore obtained when the experimental action which precedes the measurement of P' affects the 2 substances in a very different degree quant. (type 2) or when the differences in the 2 properties measured are very unequal for the 2 components (*i. e.*, for $x = y$, $n—n'$ should be as great as possible). Methods of the 2nd type are the more accurate the greater the difference in at. wt. or mol. wt. of the 2 substances. Accuracy is greater in methods in which the experimental action which precedes the measurement of P' affects only one of the 2 components or affects them both in an opposit sense (*i. e.*, $n—n'$ is frequently found greater if n or $n' = 0$ or if n and n' are of different sign). The concrete error in detg. x and y is a function of the product of P' by its coeff. (the coeff. which appears on solving the original equations for x and y) and not of the coeff. alone, as is often supposed. In order that P' should be small n and n' should be large and of negative sign or, if positive, they should be exceedingly small (or one of them should equal zero). In methods by difference the relative error in the value detd. indirectly

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(x) is equal to the error in that detd. directly (y), provided both values are equal; the former error is less than the latter if the value detd. indirectly is greater than that detd. directly and greater in the contrary case. Indirect methods should not be employed for detg. one of 2 components which is present in small amt. as compared with the other one. H. S. PAINE.

Physico-chemical Volumetric Analysis. III. Precipitation Followed by Change of Potential. P. DUTOIT AND G. VON WEISSE. Univ. Lausanne. *J. chim. phys.*, **9**, 578–607.—The authors propose a detailed study of the practical application of the principles of conc. cells to volumetric analysis by pptn. In order to maintain a definit fall of potential at the electrode (Cu or Ag), it was necessary to produce polarization by means of a feeble auxiliary current, and in order to prevent conc. differences being set up by this current, revolving electrodes were employed on the side where conc. change was to be made. The following 5 sources of error have been studied: (1) *Speed of stirring.* When the electrode is rotated above a certain minimum rate, further increase of speed is without effect. (2) *Effect of foreign substances.* Such presence always causes a shift in the end point. (3) *Effect of dilution.* If the precipitant and soln. be correspondingly dild. so that the conc. ratio remains unchanged, the end point is nevertheless shifted, less reagent being required to reach the end point, the greater the diln. (4) *Influence of the auxiliary current.* In some cases increase of auxiliary current may reduce the amt. of precipitant (5) Duration of the titration also plays a considerable role; not more than 10–15 min. should be consumed. In general, the more absorbent the nature of the ppt. forming, the greater the influence of all sources of error. The order of decreasing sensibility is as follows: $Cu_2Fe(CN)_6$, $Ag_4Fe(CN)_6$, AgI, AgCl, ZnS, CuS, AgBr. In the case of the pptn. of Cu^{++} by $K_4Fe(CN)_6$, even low auxiliary currents produce a large shift, but in titrating with sulfide as precipitant, large variations of current are necessary to produce a serious effect. IV. *Ibid.*, 608–29.—In detg. the best conditions for these titrations, each source of error mentioned above was studied in turn with the following results: The most satisfactory precipitant is Na_2S or K_2S. The Merck cryst. products are much preferable to solns. obtained by passing H_2S into alk. soln., the latter being very susceptible to deterioration and oxidation. The soln. to be titrated should be first neutralized with NaOH and then acidulated with AcOH. The intensity of the auxiliary current should be less than 10^{-4} amps. The normality of the alk. sulfide reagent should be detd. directly against a known Cu or Ag soln. With proper precautions quantities of Ag or Cu of the order of 0.1–0.2 mg. of metal per l. can be titrated. **V. Titration and Separation of the Halides.** *Ibid.*, 630–40.—The same method may be applied to the detn. of the halides by pptn. with Ag or some such suitable precipitant. The method has no practical interest in the ranges of conc. where the ordinary and more accurate volumetric methods apply, but is of importance in greater diln. and in presence of large excess of bromide or chloride. Results are obtainable in solns. as dil. as 10–20 mg. of chloride per l. or even smaller quantities of bromide or iodide. The titration of a mixt. of all 3 halides furnishes 2 end points, the 1st a very marked one where the pptn. of iodide is just completed, and the 2nd, less sharp, where pptn. of all halides is complete. It is possible to titrate iodide in presence of enormous excesses of bromide and chloride (up to 600 fold). Application of the method may be found in the detn. of iodide in urin or of chloride in chlorate. S. C. LIND.

The Reaction of Pyrophosphates with Luteo-cobaltic Chloride. M. SESÉ AND JOAQUIN NÓ HERNÁNDEZ. Salamanca. *Anales fac. cien., Zaragoza*, **2**, 25–30.—The ppt. obtained is insol. in an excess of either the pyrophosphate or the luteo-cobaltic chloride soln. and is likewise insol. in HNO_3, HCl, NH_3 water, KOH soln. (in cold),

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alc., and Et_2O; it dissolves in H_2SO_4, AcOH, NaOH soln. (in cold) and in KOH soln. (warm). One drop of a 4% soln. of luteo-cobaltic chloride suffices to show the presence of a min. quantity of 0.00335 g. combined $H_4P_2O_7$ in 1 cc. of liquid. The luteo-cobaltic chloride reagent also gives ppts. with $NaNO_3$, $NaPO_3$, acid K antimonate, but not with $NaNO_2$, Na_2PO_4, Na arsenite, K arsenate and borax. H. S. PAINE.

Reaction of Pyrophosphates with Luteo-cobaltic Chloride. M. SESÉ. Salamanca. *Anales soc. españ. fis. quim.*, 9, 82–4.—Referring to a previous paper (see preceding abstract) on this reaction S. states how the ppt. with luteo-cobaltic chloride and pyrophosphates can be distinguished from that formed when metaphosphates, nitrates, and pyroantimonates are also present. The pyrophosphate ppt. is in the form of silky needles, while that of metaphosphates is not cryst., but granular and of a deeper red color than the former. The ppt. with luteo-cobaltic chloride and $NaNO_3$ is seen under the microscope to be composed of small cubical crystals. The metaphosphate ppt., but not the ppt. with luteo-cobaltic chloride and pyrophosphates, is sol. in HCl; the latter ppt. dissolves in cold AcOH, while the former is sol. in neither hot nor cold AcOH. Nitrates and antimonates can, moreover, be distinguished by the usual tests for NO'_3 and Sb'''. With the luteo-cobaltic chloride reagent and $AgNO_3$ ortho- (orthophosphates are not pptd. by luteo-cobaltic chloride), meta-, and pyro-phosphates can be qualitatively differentiated. H. S. PAINE.

Determination of Sulfur in Combustible Substances. PAULINO SAVIRON. Saragossa. *Anales fac. cien., Zaragoza*, 3, 70–1.—Incomplete combustion due to volatilization and condensation in the cooler parts of the app. in the case of substances such as lignite, etc., can be avoided by introducing O at both ends of the combustion tube and gradually heating the tube toward the boat containing the substance.

H. S. PAINE.

Methods of Analysis of Alloys Containing High Percentages of Tungsten. T. KUCZYNSKI. Lemberg. *Bull. intern. acad. sci., Cracovie*, 1911, *A*, 542–4.—When the substances accompanying the W are easily volatil with Cl, the coarsely powdered substance is heated in a stream of Cl in a tube connected with a Peligot tube containing 1 : 5 HCl, the tube and the Peligot rinsed with hot dil. HCl, then with dil. NH_4OH, the soln. treated with 5 cc. HNO_3 and excess of HCl, boiled, conc. to 60 cc., the tungstic acid filtered off and washed, the filtrate evapd. to dryness, dried at 120°, taken up in hot HCl, again boiled, and the further small amt. of tungstic acid filtered off and treated as before. To remove the small amts. of Fe, the tungstic acid is dissolved in NH_4OH and boiled with excess of 1 : 10 HCl till the disappearance of the Fe reaction, the tungstic acid in the filtrate being recovered as above. To weigh it, it is dissolved in NH_4OH, evapd. to a small vol. in a quartz crucible, treated with excess of HNO_3, evapd. to dryness and ignited in the flame of a Bunsen burner, pure light yellow WO_3 being thus obtained. The method is recommended when C, which remains in the boat after treatment with Cl, is to be detd. also. Otherwise, the following is more rapid: To every 0.2 g. substance are added 5 cc. HNO_3 (d. 1.4), 2 cc. H_2O and about 0.5 g. solid NH_4F. Sometimes, 2–3 drops conc. H_2SO_4 are necessary to start the reaction, which is finally completed by warming on the H_2O bath. To the clear soln. are added 2–3 cc. conc. H_2SO_4 and the liquid evapd., finally over a free flame, until the HF is completely driven off. The product is transferred to a beaker, with the aid of NH_4OH, if necessary, dild. to 60 cc., treated with 20 cc. conc. HCl and worked up as in the Cl method. CHAS. A. ROUILLER.

Determination of the Ferrous Ion with Iodine. G. ROMIJN. *Chem. Ztg.*, 35, 1300.—R. considers that in the method proposed by Rupp (*Ber.*, 36, 164 (1903)), the addition of AcONa or Na tartrate, renders the oxidation of Fe″ by I more nearly complete, because of the removal of Fe‴ ions in the formation of hydrolyzed or complex

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salts. He recommends for this purpose the use of $Na_4P_2O_7$, in the presence of sufficient acid to form the acid salt $Na_2H_2P_2O_7$. The time required for oxidation is thereby reduced from 3 hrs. to 5 mins. Results by this method are slightly low, due probably to oxidation of Fe" by the air. The method is especially useful for the detn. of Fe" in the presence of organic matter, as in drugs, etc. In such materials add HCl or H_2SO_4, sufficient to produce 20 cc. *N* acid. Add 20 cc. 0.1 *N* I soln., and 5 g. powd. $Na_4P_2O_7$. Shake till dissolved, let stand 5 min., and titrate the excess free I with 0.1 *N* $Na_2S_2O_3$. WILLIAM BLUM.

Simplified Standardization of Standard Acid without the Aid of Standard Alkali. F. KLINKERFUES. *Chem. Ztg.*, **35**, 1274.—K. proposes to det. the strength of standard acid, by distillation of the NH_3 from a weighed amt. of pure $(NH_4)_2SO_4$, into an insufficient amt. of the stand. acid. Under these conditions the excess of NH_3 remains in the distillate and can be titrated with the stand. acid, the strength of which is detd. by the total acid neutralized. WILLIAM BLUM.

Estimation of Arsenic as Ammonium Arsenomolybdate. H. PELLET. *Ann. chim. anal.*, **16**, 455–6.—P., working with M. P. Champion, found that the wt. of arsenious acid in the yellow ppt. of NH_4 arsenomolybdate is obtained by multiplying by 4.38, and the wt. of arsenic acid by using the factor 5.1. This gives the ratio of arsenic acid to molybdic acid as 1:21.8. Maderna worked out the ratio by the same method and found it to be 1:24. P. accounts for the difference by the fact that the comp. of the yellow ppt. is affected by the conditions under which the work is carried out, and these differed considerably in both cases. R. A. CUNNINGHAM.

Microchemical Reactions for Manganese. M. WAGENAAR. *Pharm. Weekblad*, **49**, 14–5.—The microchem. reaction of Schoorl, dependent on the formation of oxalate crystals, fails in presence of strong organic acids and in conc. sols, but when sols are weakly acid crystals are given with less than 0.0003 mg. In presence of Zn the reaction fails. W. suggests the use of K_2CrO_4 which gives dark brown crystals grouped in free rosets; in greater dilns. they lie together. At first they appear as dark points. They are doubly refracting. Reaction is given by 0.005 mg. Fluid should be weakly acid or neutral. Crystals dissolve in strong acid. Zn gives an amorphous ppt. 11 mg. can be detected in presence of 10 mg. Zn. With greater quantities of Zn it is better to ppt. Mn as MnO_2 with NH_4OH and H_2O_2. Quantities less than 0.1 mg. Mn cannot be washed and centrifuged out but 1 pt. can be detected in presence of 1000 of Zn. V. E. HENDERSON.

A Modification of the Gay-Lussac Method. E. J. HALL AND L. E. SALAS. *Mining Eng. World*, **35**, 967–9.—Owing to the difficulty in applying the ordinary wet method for the assay of Ag bullion containing Sn, a series of analytical expts. were carried out to see if the colloidal metastannic acid, which obscures the titration end point, could not be eliminated. If tartaric acid (2 g. to 1+ g. of a bullion containing 5% Sn) is dissolved in the least quantity H_2O and added to the bullion, then 10 cc. HNO_3 (1 : 1) added and the bottle rotated slightly to mix the acids thoroughly, the bullion dissolves and a clear soln. is obtained. The amt. of bullion to be taken must be such as to have an excess of Ag in soln. after 100 cc. NaCl has been added. The bullion must be dissolved in the cold. It is not necessary to boil off nitrous fumes. The assay must not be heated after HNO_3 is added. E. C. LATHROP.

The Determination of Ferric Oxide in the Presence of Aluminium Oxide. O. KALLAUNER AND J. JURÁNEK. Boh. Tech. High School, Prague. *Chemické Listy*, **6**, 5–6.—The following observations in connection with the customary methods were observed: If Fe_2O_3 is dissolved in HCl direct titration with $KMnO_4$ after reduction is impossible, but if H_2SO_4 is used, titration at once is possible after reduction. The bisulfate is eliminated. P. J. HANZLIK.

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Two New and Very Delicate Tests by Use of the Reagent "Tetramethyl Base." R. J. CARNEY. *J. Am. Chem. Soc.*, **34**, 32–5.—A review of the uses of this reagent in the detection of Pb, Mn and O_3. The 2 new methods are to detect Au and NH_3. In the former free mineral acid should be avoided. The color produced is purple changing to blue. The delicacy of the test is 0.01 mg. per 50 cc. In the latter the color is purple. 0.01–0.2 mg. of NH_3 can be detected. Results are given. R. A. CUNNINGHAM.

The Colorimetric Estimation of Salicylic Acid and Copper. F. SCHOTT. Lausanne. *Z. Nahr.-Genussm.*, **22**, 727–8; cf. Sherman and Gross, *C. A.*, **5**, 2792.—The Jorissen reaction is utilized. Detn. of salicylic acid: 2 cc. of the soln. under exam. are treated with 2 cc. of a 10 times dild. Fehling's $CuSO_4$ soln. and 5 drops each of 2% KNO_2 and 10% AcOH and dild. to 5 cc. Standards containing from 0.02 mg. up of salicylic acid are treated in the same way. The solns. are placed in test tubes of equal diam. and heated in b. water $^3/_4$ hr. On cooling the colors are compared directly or in a colorimeter. With milk, 25 cc. are treated with 10 cc. Fehling's $CuSO_4$ soln. and *N* NaOH until the soln. is only weakly acid. To 15 cc. of the filtrate 5 drops of 10% KNO_2 and 5 drops 50% AcOH are added, and the solns. and standards treated as above. 10 mg. salicylic acid per l. produce a comparable color. Detn. of Cu: The soln. under exam. is mixed in a test tube with 0.3 cc. of a ½% aq.-alc. soln. of salicylic acid and 5 drops each of 2% KNO_2 and 10% AcOH, dild. to 5 cc. and heated as in the preceding method. Other test tubes containing 0.01, 0.02, etc., mg. Cu as standards are similarly treated. 0.01 mg. Cu may be detd. Sucrose, glucose, lactose, invert sugar and traces of Fe do not interfere, but free mineral acids, tartaric and citric acids, and large amts. of Fe mask the reaction. P. B. DUNBAR.

Systematic Analysis of Compounds Acting Like Phenols. J. A. SANCHEZ. *Bull. soc. chim.*, **9**, 1056–9.—S. outlines recognized tests for 9 phenolic compds. and utilizes these with modifications to effect their systematic detection when occurring together. L. JOSLYN ROGERS.

Soluble Silver Oxide (SCHAEFER). **17.** Determination of Arsenic in Organic Substances (BOHRISCH, KÜRSCHNER). **17.** Estimation of Sucrose (BRUCKNER, WELWART). **28.**

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8. MINERALOGICAL AND GEOLOGICAL CHEMISTRY.

ROGER C. WELLS.

Summary of the Mineral Production of the United States in 1910. W. T. THOM. U. S. Geol. Survey. Extract from *Mineral Resources*, for **1910**, 62 pp.—Details are given for each mineral or chem. and by states. R. C. WELLS.

Potash. The Search for Potash in the United States. H. S. GALE. **Occurrence of Potash Salts in the Bitterns of the Eastern U. S.** W. C. PHALEN. **Potash-bearing Rocks of the Leucite Hills, Wyoming.** A. R. SCHULTZ AND WHITMAN CROSS. U. S. Geol. Survey, *Bull.* **530-A, 530-B** and **512**.—The sources now known are: Igneous rocks, greensand marls, alunite, salines, organic sources including kelp, beet sugar molasses, etc. A review of salines and the progress of prospecting by boring is given in the 2nd bull. The 3rd shows that the K_2O content of the Leucite Hills amounts to 197,000,000 tons. R. C. WELLS.

Considerations on Tschermak's Method of Determining Silicic Acids. E. BASCHIERI. *Atti soc. tosc. sci. nat., Proc. verb.*, **19**, No. 5; cf. Tschermak, *C. A.*, **4**, 551, 2081; **5**, 775.—From the decomp. of apophyllite and datolite with acids B. obtained silicic acids having 12 and 13% of H_2O. Supporting the method of Tschermak, he

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argues that the silicilic acids cannot be "absorption compounds," since they show discontinuous desiccation curves. R. C. WELLS.

Model for Illustrating the Stereographic Projection. E. A. WÜLFING. Min. Inst., Univ. Heidelberg. *Centr. Min.*, 1911, 749–52. E. T. WHERRY.

Thortveitite, a New Mineral. J. SCHETELIG. Christiania. *Centr. Min.*, 1911, 721–6.—In a rare-earth-bearing pegmatite in Sätersdalen, Norway, a new mineral has been found with the following properties: Orthorhombic, prismatic, with (110), (221), (111), and (112?), axial ratio 0.7456 : 1 : 1.4912. Cleavage prismatic, very brittle, H. 6–7, sp. gr. 3.5712, luster brilliant vitreous, color grayish green; opt.—, 2V about 80°, $n\ \alpha$ 1.7573, γ 1.8030; difficultly fusible, slowly attacked by HCl. Comp.: SiO_2 42.86; R_2O_3 57.67; H_2O 0.44; sum 100.97; R = Sc and the Y metals but no Ce, formula therefore $(Sc,Y)_2Si_2O_7$; it is thus the first known Sc silicate, containing about 40% Sc_2O_3, and being most closely related to thalenite ($Y_2Si_2O_7$). E. T. WHERRY.

Chemico-crystallographic Study of the Chloro- and Bromoplatinates and Stannates of the Tetraalkylamines. A. RIES. Bamberg. *Z. Kryst. Min.*, 49, 513–617.—The polymorphism and morphotropism of 64 compds. were studied, most of them showing trimorphism similar to $(NH_4)_2PtCl_6$ and $(NH_4)_2SnCl_6$: cubic tetrahedral at very low temps., pseudo-octahedral almost up to 0° and cubic holohedral from this up to the decomp. point. For instance $(NMe_4)_2PtCl_6$ is pseudo-cubic up to —58°, holohedral above this; $(NMeEt_2C_4M_7)_2PtCl_6$ is monoclinic (pseudo-diploidal) below 78°, cubic diploidal above this, and also forms labil pseudo-tetrahedrons from hot solns., etc. In general, all of the substitution products indicate by their octahedral or pseudo-octahedral cleavage the presence of the octahedral space-lattice type of structure, although representing all 5 cubic point-systems. The Me, Et, Pr, amyl, and Bu compds. are decreasingly symmetrical in the order given, the bromides also being less symmetrical than the corresponding chlorides. Tabulation of their decomp. and m. ps. shows lowering with increasing mol. wts., while the transition points show the reverse relation. Further, the transformation points from less into more symmetrical forms are in every case higher, the less symmetrical the substitution. The stability ranges of the various modifications thus appear to depend on 2 factors, mol. wt. and mol. symmetry, which act however in widely varying degrees in different cases. It is noteworthy that the crystallographic relations are not extensively altered morphotropically by even rather extreme substitutions, although satisfactory detn. of topic axes could not be made, since the ds. for really corresponding states—equal distances above the transition points—are not available. But isomorphous mix-crystals were obtainable with many members of the series, most readily when the relative mol. proportions were 1 : 1. As a corollary to these observations, it is predicted that a corresponding behavior will be shown throughout the columns of the periodic system, increase in mol wt. lowering the stability ranges of the various forms of polymorphous compds. E. T. WHERRY.

The Microstructure of Magnetite and Related Members of the Spinel Group, and their Relation to Hematite. O. MÜGGE. Univ. Göttingen. *Neues Jahrb. Min Geol.*, 32, (*Beil. Bd.*), 491–534.—When magnetite crystals or sections are fused with $KHSO_4$ and heated until nearly dehydrated, the faces become coated with a powdery cryst. film, yielding glimmering reflections in definit positions, in 3 directions on the octahedral, 4 on the cube, and 2 on the dodecahedral faces. Franklinite shows the effect less clearly, the other spinels only slightly if at all. The coating regains a brilliant luster on simple rubbing on a porcelain plate, yielding a red streak, and since it is nonmagnetic and on analysis shows only Fe_2O_3, must be regarded as hematite. Since the melt, even when satd. with Fe, does not deposit Fe_2O_3 on cooling on either magnetite or hematite, the metal must have been originally present, intergrown with the Fe_3O_4; this is also indicated by the variation in behavior of specimens from different

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localities. The orientation shown, tabular crystals of hematite parallel to the octahedron faces, is also that of natural interg owths of the minerals, and martites, in proportion to the stage of their alteration, present similar relations. The only satisfactory explanation of the phenomena is that the Fe_3O_4 dissociates into FeO and Fe_2O_3, the latter forming oriented nuclei, which grow as the FeO is oxidized either in nature (martite) or in the fusion expts. The reverse change has also been observed in nature, and can be artificially reproduced by heating hematite to 1500° in an inert gas (or to 700° in a reducing atm.) when regularly arranged magnetite crystals develop on its surface. Magnetite is thus to be regarded as a solid soln. of Fe_2O_3 in cubic FeO, forming "anomalous mix-crystals" which accounts for its magnetism and other properties. E. T. WHERRY.

The Question as to the Mineralogical Nature of the Russian Phosphorites. VLADIMIR TSHIRVINSKII. Univ. Kiev. *Neues Jahrb. Min. Geol.*, 1911, II, 51–74.—These phosphate rocks may at once be divided into 2 g oups, those with cryst. cement, with a birefringence of 0.008, and those with less or no birefringence. Analyses of the former show $CaCO_3$ in combination with the phosphate, partially or completely replacing CaF_2, while in the latter the $CaCO_3$ present is not combined, and the phosphate is typical fluorapatite. More detailed study of their comp. suggests classification as follows: (1) Fluorapatite; (2) podolite, $3Ca_3(PO_4)_2CaCO_3$; (3) an unnamed mineral, $2Ca_3(PO_4)_2CaCO_3.CaF_2$; (4) another, $3Ca_3(PO_4)_2 2CaCO_3$; and (5) mixts. containing Al and Fe phosphates. The other described Ca phosphate mineral dahllite, francolite, and staffelite need further investigation. E. T. WHERRY.

Speculations Regarding the Genesis of the Diamond. O. A. DERBY. *J. Geol.*, 19, 627–32.—The deep-seated thermal processes which accompanied or followed the explosive action caused a hydration (serpentinization) of the olivine in the kimberlite and at the same time the formation of a certain amt. of calcite, introducing the C in the form of CO_2, this gas being always present in kimberlite. Possibly the diamond is the result of some chem. action involving this CO_2 in which a segregation took place of a portion of the C in the solid form. W. F. HUNT.

Analyses and Chemical Composition of Tetrahedrite. A. KRETSCHMER. Breslau. *Z. Kryst. Min.*, 48, 484–513.—The paper gives 15 new analyses of tetrahedrite and concludes that the general formula of the mineral is $(M'_x, M''_y)_3M'''S_3 + y/2$, where M′ = Cu, Ag; M″ = Zn, Fe, Pb, Hg, Mn, Ni; M‴ = Sb, As, Bi; $x + y = 3$. The formula $xCu_6Sb_2S_6 + Zn_6Sb_2S_6$ is given to show the "chemical analogy" of the groups (Cu_6Sb_2) and (Zn_6Sb_2). The app. used for analysis—attacking the mineral with Cl_2—was practically without rubber connections. E. S. LARSEN.

Chrysoberyl from Marschendorf and its Associates. FRANZ KRETSCHMER. Sternberg. *Min. petrog. Mitt.*, 30, 85–103.—Chrysoberyl occurs at Marschendorf in a sillimanite pegmatite. The associated minerals are blue spinel, chlorospinel, pleonaste, magnetite, chrysoberyl, ilmenite, sillimanite, cyanite, almandite, and common garnet. E. S. LARSEN.

Datolite. R. GÖRGEY AND V. GOLDSCHMIDT. Heidelberg. *Z. Kryst. Min.*, 48, 619–56.—A detailed description and discussion of datolite crystals from several localities. E. S. LARSEN.

Mineralogic Notes. F. N. GUILD. Univ. Arizona. *Z. Kryst. Min.*, 49, 321–31.—The paper gives a description, chiefly crystallographic, of cuprodescloizite, vanadinite, wulfenite, linarite, caledonite, calcite, atacamite, and anglesite. An analysis of cuprodescloizite from the old Yuma Mine, Arizona, gave: PbO 52.26, CuO 11.64, ZnO 6.71, V_2O_5 23.02, H_2O 2.52, total 98.31. A descloizite from Argentina gave:

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Cl 0.08, insol. 0.78, As_2O_5 0.11, PbO 53.36, CuO 1.21, FeO 0.56, ZnO 13.15, MnO 4.56, V_2O_5 23.05, H_2O 2.27, total 99.13. E. S. LARSEN.

The Phonolite Laccolith of Marienberg-Steinberges Near Aussig a. d. E. F. CORNU. Leoben. *Min. petrog. Mitt.*, 30, 1–84.—This paper gives a detailed description of the phonolite of the Marienberg-Steinberges laccolith; the weathered rock, the contact phase, and the inclusions are also described. E. S. LARSEN.

Preliminary Notes on Some Igneous Rocks of Japan. IV. S. KOZU. *J. Geol.*, 19, 632–44.—A study of the lava and anorthite crystals erupted from the Tarumai volcano in 1909. The rock is composed of plagioclase, hypersthene, augite, olivine, magnetite, apatite, and microliths, scattered through a glassy groundmass. The prevailing phenocrysts are of anorthite. The mineralogical and chem. characters of the rock seem to indicate a pyroxene-andesite. Under the quant. system the rock would be classified as a bandose. The anorthite phenocrysts were roughly measured with a contact goniometer and 4 types noted. Twinning according to the Carlsbad, Manebach, albite, and pericline laws was observed. The chem. as well as the optical detn. revealed the comp. of the anorthite to be Ab_5An_{95}–Ab_4An_{96}. W. F. HUNT.

Bearings of Radioactivity on Geology. T. C. CHAMBERLIN. *J. Geol.*, 19, 673–96.—A treatment of the distribution and surface conc. of radioactive substances with a discussion of the coöperative influence of the planetesimal and radioactive agencies in jointly producing the internal heat of the earth. The present distribution of vulcanism is also briefly discussed. W. F. HUNT.

Corundum-syenite (Uralose) from Montana. F. ROGERS. *J. Geol.*, 19, 748–52.—The gneissoid corundum-syenite is composed of microcline-perthite, biotite, and corundum with subordinate quantities of sillimanite, muscovite, zircon, and baddeleyite. The feldspar crystals are sometimes arranged in augen. The corundum whose max. size is about 2 cm. is often surrounded by a zone of feldspar. Baddeleyite rather than zircon forms in this rock probably on account of the low % of SiO_2. The crushed rock was sepd. into its constituents by the use of Thoulet soln. and showed: Feldspar 62.7%, corundum 30.9%, biotite 5.8, baddeleyite 0.5. W. F. HUNT.

Apparent Sun-crack Structure in Diabase. EDGAR T. WHERRY. *Bull. Geol. Soc. Am.*, 22, 718.—The upper surface of the diabase sill of the Newark Group, in Montgomery Co., Pa., reveals a network of lines simulating sun-cracks which consist of streaks of coarsely crystd. augite and feldspar traversing the fine-grained groundmass. They are probably shrinkage cracks produced by the cooling of the diabase and later filled by molten material from the interior. W. F. HUNT.

Occurrence of Silver, Copper, and Lead Ores at the Veta Rica Mine, Sierra Mojada, Coahuila, Mexico. F. R. VAN HORN. *Bull. Geol. Soc. Am.*, 22, 738.—These ores occur at or near the contact of an acid breccia with an underlying limestone of Cretaceous age. There are 2 types of ores, an Ag–Pb and an Ag–Cu series. The Ag–Pb minerals are all oxidized and consist chiefly of argentiferous cerussite with S and some gypsum. The Ag–Cu minerals contain sulfides as well as oxidized minerals. Another zone consists of a siliceous limestone impregnated with cerargyrite and native Ag. Pearcite and other Ag minerals were found along a fault cutting this "silver-lime" ore body. W. F. HUNT.

The Ore Deposits of Waldeck. KARL MASLING. *Z. prakt. Geol.*, 19, 361–77.—The ores of this district comprize low grade hematite, which is largely sedimentary, though showing evidence of some metasomatic changes; Mn oxides, also of sedimentary type; a Cu shale, clearly the result of replacement by circulating waters; and small fissure veins of Pb and Zn, carrying a little Au. E. T. WHERRY.

Sketch of the Gold Fields of Northern Ontario. WALTER BAELZ. *Z. prakt. Geol.*,

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19, 377–85.—The Au occurs in quartz veins intimately connected with a granit mass. E. T. WHERRY.

The Nephrite of the Alps and Franconia. OTTO A. WELTER. Bonn. *Neues Jahrb. Min. Geol.*, 1911, II, 68–106; cf. *C. A.*, 5, 1384.—The masses of nephrite found in various places in association with serpentinized gabbro, are rather variable in comp., but approach the ratio $SiO_2 : CaO : MgO : H_2O = 4 : 1 : 3 : 1$. E. T. WHERRY.

Inclusions in the Granit of Roccapietra, Italy. G. LINCIO. Univ. Turin. *Neues Jahrb. Min. Geol.*, 1911, II, 75–85.—Lens- or egg-shaped masses in the granit contain in addition to the usual minerals abundant tourmaline, zircon, apatite, and ilmenite. They are either recrystd. inclusions of gneiss, or pneumatolytic cavity fillings. E. T. WHERRY.

Geophysical Research. A. L. DAY. *Met. Chem. Eng.*, 10, 90–4. E. J. C.

The Formation of Coal Beds. J. J. STEVENSON. *Proc. Am. Phil. Soc.*, 50, 519–643.—The topics considered are: The effects of floods upon a cover of vegetation, the phenomena of peat deposits, and the buried forests. In considering the effects of floods S. describes: The work of torrents, the protection against erosion offered by a cover of vegetation, river floods as evidenced by the rivers of the Atlantic coast and of the great interior basins, and the plant materials transported by rivers. In describing the phenomena of peat deposits, S. treats the following subjects: Peat making plants, peat in the tropics, peat and peaty materials, the characteristics of peat accumulations, peat deposits in the U. S. and in Europe. In considering buried forests, S. describes the conditions attending these phenomena and also presents the different hypotheses held in regard to the formation of coal beds. J. H. BOWER.

The Color of Soils (ROBINSON, MCCAUGHEY). 15. Movement of Soil Material by Wind (FREE, STUNTZ). 15. Soil Erosion (MCGEE). 15.

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9. METALLURGY AND METALLOGRAPHY.

WILLIAM BRADY, WILLIAM T. HALL.

Use of High Pressure Gas for Melting Metal. E. W. SMITH. *J. Gas Lighting*, 116, 700–1.—The use of high pressure gas in metal-melting furnaces has been notably successful, the greatest advances having been made in brass m. The volatility of the Zn is always a difficulty here and the greater ease of regulation of gas as compared with coke has made possible both a reduced loss of metal and a longer life for the furnace. 30 heats are being made in gas-heated furnaces, where only 24 heats are possible with coke. The comparative cost results in dollars which cover a 3 days' test at the works of a large Birmingham firm, for gas-fired and coke-fired furnaces, resp., are: Pots, per cwt., 0.08, 0.10; metal lost, per cwt., 0.22, 0.335; fuel, 0.15, 0.09; total, 0.45, 0.525. The tests were made on Cu-Zn alloys of variable comp. in a cylindrical furnace with a 160 lb. graphite pot. 5 heats a day were made, taking about 2½ hrs. less time than the usual Birmingham practice. These figures take no account of the saving in labor costs, and the cartage of coke, removal of ashes and other extras connected with coke-heated furnaces. It is also stated that the figure given for the cost of melting by coke is extremely low. The price of gas in these tests was $0.325 per 1000 ft. C. A. COLE.

Recent Developments in Zinc Ore Dressing. J. M. MCCLAVE. *Mining Sci.*, 65, 90–1. E. J. C.

Indian and Chinese Zinc. W. HOMMEL. *Z. angew. Chem.*, 25, 97–100. E. J. C.

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Metallurgy in British Columbia. E. JACOBS. *Met. Chem. Eng.*, 10, 112–3.—In 1911. E. J. C.

Sinter-roasting with Dwight-Lloyd Machines at Salida, Colorado. ANON. *Met. Chem. Eng.*, 10, 87–90. E. J. C.

Chemistry and Metallurgy in Great Britain. ANON. *Met. Chem. Eng.*, 10, 85–6.—A retrospect of 1911. E. J. C.

Utilization of Blast Furnace Gases. W. DIXON. West of Scotland Iron and Steel Inst. *Times Eng. Suppl.*, Oct., 1911; *J. Soc. Chem. Ind.*, 30, 1316.—The advantage of blast furnace gas for power production is pointed out. J. J. M.

High Extraction Processes in the Metallurgy of Gold and Silver. T. L. CARTER. *Eng. Mag.*, 42, 515–40.—A review. C. N. MOORE.

Design of Open-hearth Furnaces. M. A. PAVLOV. *Stahl u. Eisen; Can. Eng.*, 22, 219–20.—Engineering data for dimensions in U. S. and foreign practice. L. P.

Autogenous Welding and Cutting. HENRY CAVE. *New Eng. Engineer*, 3, 18–23.—C. gives a history of the development of the $O-C_2H_2$ torch which produces a flame $^3/_8$ in. long with a temp. of 6300° F. LOUIS W. RIGGS.

Industry of the Recovery of Tin from Tin Plate in Italy. ANON. *Rass. min.*, 36, 27–8.—Brief description of the processes followed by the firms Dossman dott. O. at Pegli and Soc. elettrochim. Vesuviana at S. Giovanni a Tettucio. CHAS. A. ROUILLER.

Manufacture of Aluminium Leaf and Dust. LEON GUILLET. *Bull. soc. ing. civ. France*, 7, No. 10; through *Rass. min.*, 36, 49–52.—Brief description of the processes used. CHAS. A. ROUILLER.

The Employment of Ferro-alloys in Iron Smelting. W. VENATOR. *Chem. Ztg.*, 35, 1427–8.—A brief historical review, emphasizing the progress in recent years due to modern facilities. F. W. SMITHER.

General Foundry and Steel Works of the Societe francaise de constructions mechaniques Formerly Etablissements Cail. CH. BOUVARD. *Rev. métal.*, 8, 647–54.—Largely drawings. E. J. W.

The Electromagnetic Separation of Iron. GEORG RIETKÖTTER. Hagen i/W. *Stahl u. Eisen*, 31, 1790–2.—Four electromagnetic separators for removing metallic Fe from rubbish, slag, etc., are illustrated. Some old dumps contain as much as 20% Fe. In foundries 10–12% of the Fe is lost; of this the foundry wastes contain 7–10%. The av. cupola slag contains 4–6% Fe recoverable in this way. E. J. WITZEMANN.

The Addition of Titanium to Iron and Steel. ANON. *Stahl u. Eisen*, 31, 1792–4.—An account of the relative value of the use or omission of small percentages of Ti in ordinary cast irons at a variety of plants. The results given indicate that the value of the Ti when used in this way exceeds by far its original cost. E. J. W.

The Variation of the Properties of Metals Produced on Working Them. G. TAMMANN. *Nachr. Ges. Wiss. Göttingen*, 1911, 181–96.—A recapitulation and general discussion of the work of Faust and Tammann (*C. A.*, 5, 233), followed by additional similar expts. with cubes of Au, alloys of Cu–Ag, Cd–Zn, Cu–Mn. The previous conclusions are confirmed; in addition, it is found that the alloys of 2 metals of similar compression strength show a much greater compression strength than either of the pure components. This is attributed to the fact that alloys are in general of much finer grained structure than the pure metals; especially is this the case with eutectics, which are always very much stronger than the weaker of the component metals. While the elastic properties of metals are much changed on working, *e. g.*, by drawing to wire, owing to a diminution in size of grain, some other vectorial properties are not

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much affected. The elec. cond. is, however, changed considerably, but recovers its original value on annealing the metal again. Scalar properties such as *d.* and energy-content are considered to be little affected by working the metal. J. JOHNSTON.

Effect of Temperature upon the Ductility of Zinc. W. B. HAINES. Univ. Coll., London. *Proc. Roy. Soc. London*, *A*, 85, 526–32.—Com. Zn, which always contains Pb, becomes soft at about 150°, while it is said to become hard and brittle at about 200°. An investigation of these changes was made by measuring the extension of a Zn wire immersed in an oil bath and stretched by a wt. applied to the upper end by means of a pulley. It was found that consistent results could be obtained only if the wires had been treated in exactly the same manner. At each temp. the rate of extension of the wire was calc. from observations for several loads ranging up to the breaking stress. As a measure of ductility, the slope of the final portion of the curve corresponding to the particular temp. was taken. Com. Zn becomes gradually softer with rise in temp. until about 90°, when a hardening sets in, which is so rapid that, at 110° the behavior is comparable with that at 30°. From 110° onwards there is a regular softening as the temp. rizes; this certainly continues up to 200°, and the expts. indicate that it continues at least up to 250°. The hardening in the region of 100° takes some time to develop. The effect of heating Zn wire to temps. above 120°, and then cooling, is to diminish greatly its tenacity and ductility; this is due to the cryst. structure induced. The ductility is restored by some such mechanical process as hammering; this destroys the cryst. structure. Comparative expts. were made with bars of pure Zn and of commercial Zn (which contained 0.52% Pb). The pure Zn shows no anomaly at about 100°; it becomes uniformly softer as the temp. rizes, the only peculiarity being a hardening around 200°. Hence the evidence leads to the conclusion that the singularity observed in the ductility of Zn at temps. around 100° is produced by the admixture of a small proportion of Pb. J. JOHNSTON.

U. S., 1,015,863, Jan. 30. F. WERTH. **Apparatus for galvanizing metal tubes, etc.**

U. S., 1,016,457, Feb. 6. R. C. TOTTEN. **Preventing uneven shrinkage in chilled car-wheels.**

U. S., 1,015,469, Jan. 23. W. F. BLEECKER. **Producing copper, lead, or iron vanadate from ores.**

U. S., 1,016,549, Feb. 6. G. H. CLAMER. **Iron-nickel-copper alloy.**

U. S., 1,016,560, Feb. 6. F. GIOLITTI. **Armor plate.**

U. S., 1,016,715, Feb. 6. H. F. SHELDON. **Finishing metal sheets or plates.**

U. S., 1,016,758, Feb. 6. H. MEHNER. **Producing alkali metal from its oxygen compounds by reaction with molten cast iron.**

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10. ORGANIC CHEMISTRY.

J. BISHOP TINGLE.

Optically Active Amine Oxides. I. Methylethylaniline Oxide. J. MEISENHEIMER AND MARTHA HOFFHEINZ. Berlin. *Ann.*, 385, 117–26.—Methylethylaniline is oxidized by H_2O_2 to the oxide and isolated as the picrate. It is converted into the chloride and resolved with *d*-bromocamphorsulfonic acid (*C. A.*, 3, 437). The *d*-base which forms the more sol. salt is best obtained pure through the tartrate. *d-Tartrate of the d-base*, cryst., m. 134–5°, $[\alpha]_D$ 27.2°, $[M]_D$ 81.9°. This salt and the sulfonate of the *l*-oxide are directly converted into the *picrates*, m. 147–8°. These give a 55–65% yield of the active chlorides which were converted into the active oxides with the

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properties already given. **II. Methylethyl-β-naphthylamine Oxide.** *Ibid.*, 127–34.—*dl-Methylethyl-β-naphthylamine oxide*, by oxidation of the naphthylamine with Caro's acid, scales, m. 70°, vigorously decomp. immediately above this temp. Not hygroscopic. *d-Bromocamphorsulfonate*, needles from AcOEt, decomp. 135°, $[\alpha]_D$ +55.1°. Free base inactive. *d-Tartrate*, needles, m. 130–5°. $[\alpha]_D$ —30.7°. *l-Tartrate*, m. 132–5°, $[\alpha]_D$ —30.7°. The *d*-tartrate of the *d*-base was converted into the *picrate*, small crystals from alc., decomp. 118–9°. *d-Oxide*, brilliant needles from AcOEt + Et_2O, m. 67–70°, $[\alpha]_D$ +14.8°; in 0.1 *N* HCl, $[\alpha]_D$ +25°. *l*-Oxide, $[\alpha]_D$ —15.4°. **III. Kairoline Oxide.** J. Meisenheimer and J. Dodonow. *Ibid.*, 13–55.—*dl-Kairoline oxide*, from kairoline and H_2O_2, very hygroscopic crystals, decomp. 124°. Turns red in 1–2 weeks and gradually decomp. *r-Picrate*, brownish yellow needles, decomp. 122°. *Hydrochloride*, colorless crystals from alc. + Me_2CO, m. 144°. *Chloroplatinate*, decomp. 177°. *d-Hydroxylkairolinium-d-bromocamphorsulfonate*, long prisms from alc., decomp. 163–8°, $[\alpha]_D$ +76.5°, $[M]_D$ +362°. The salt reacts acid and can be sharply titrated with alkali. *l-Hydroxylkairolinium-d-tartrate*, feathery groups of crystals from alc., decomp. 145°, $[\alpha]_D$ —15.3°, $[M]_D$ —48°. The two *active picrates* form long needles, m. 126°, decomp. 127–8°. The *active chlorides* form snow white crystals from alc. + Me_2CO, decomp. 138°, $[\alpha]_D$ +44.2° and —44.2°. The *active oxides* form long tables, are very hygroscopic and unstable. *d-Oxide*, in C_6H_6, $[\alpha]_D$ +82.4°, $[M]_D$ +134°. *l-Oxide*, $[\alpha]_D$ —84°, $[M]_D$ —137°. The oxides containing $1H_2O$ show $[\alpha]_D$ +25°, $[M]_D$ +45° and $[\alpha]_D$ —25°. *dl*-Kairolinium oxide and MeI give dimethyltetrahydroquinolinium iodide, m. 170°. The reaction with dimethylsulfate presented difficulties. Alvin S. Wheeler.

Chlorophyll. XVII. Absorption Spectra of the Components and First Derivatives of Chlorophyll. R. Willstätter, A. Stoll and M. Utzinger. Swiss Federal Polytechnic, Zurich. *Ann.*, **385**, 156–88.—A grating spectroscope like that of F. Löwe made by Carl Zeiss was used. 10 photographs are given. The products were dissolved in Et_2O and the spectra were observed through thicknesses of 0.5, 2.5, 5, 10, 29, 40, 80, and 100 mm. Tables give the position and width of the bands and signs indicate the degree of intensity. Chlorophyll, component *a*, ethereal soln. blue-green with blood-red fluorescence; 7 sharp absorption bands. Component *b*, soln. yellowish green, fluorescence brownish red, 9 bands. Methylchlorophyllide *a*, very similar in all respects to chlorophyll, component *a*. Methylchlorophyllide *b*, differs from chlorophyll, component *b*, only in small details. Pheophytin, component *a*, ether soln. olive-green with red fluorescence; 7 sharp bands between the Frauenhofer lines B and G. Pheophytin, component *b*, soln. brownish red with red fluorescence; 8 bands. Methylpheophorbide *a*, like component *a* of pheophytin. Methylpheophorbide *b*, also like component *b* of pheophytin. Phytochlorin *e*, in Et_2O soln., very similar to component *a* of pheophytin; dil. HCl soln. blue. Phytochlorin *f*, Et_2O soln. beautiful green. Phytorhodin *g*, soln. wine-red. Absorption spectra were also observed of the complex K compds. obtained by dissolving the products in KOH + MeOH. K isochlorophyllin *a*, soln. greenish blue with brilliant red fluorescence. Phytochlorin *e*, in 45% KOH in MeOH, blue-green, stable for hrs., then olive-green. Deep red fluorescence. K isochlorophyllin *b*, soln. yellowish green with brownish red fluorescence. Phytorhodin *g* in conc. KOH + MeOH, like K isochlorophyllin *b*. Alvin S. Wheeler.

Chlorophyll. XVIII. Reduction of Chlorophyll. I. R. Willstätter and Y. Asahina. Zurich. *Ann.*, **385**, 188–225.—A. Pyrroles from Hemin. Hemin was reduced with HI + PH_4I according to Nencki and Zaleski. The mixt. is made alkaline and distilled in steam. The distillate is extracted with Et_2O and the strong bases removed with NaH_2PO_4. The dry Et_2O soln. is finally pptd. with picric acid fractionally. *Iso-hemopyrrole*, $C_8H_{13}N$ (I), b_{11-2} 88°, b_{735} 198°, d_4^{20} 0.915, colorless, non-

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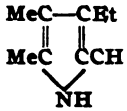
fluorescent oil. Turns red and resinifies in the air. Slightly sol. in hot H_2O and very volatil in steam. Gives the pine shaving reaction and with an acid soln. of dimethyl-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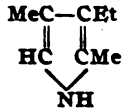
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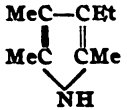
(III)

aminobenzaldehyde a cherry color. The absorption spectrum consists of a deep band in the green. *Picrate*, prisms or rhombic tables, from alc., m. 119°. *Chloropicrate*, short columns, m. 126°. *Styphnate*, $C_8H_{13}N.C_6H_3O_8N_3$, 4-cornered prisms, m. 136°. Styphnic acid is excellent to characterize pyrrole bases because the salts have strong crystallizing power, are difficultly sol., and stable. *Isohemopyrrolidine*, $C_8H_{17}N$, from isohemopyrrole by reduction with HI and red P at 235–40°. Colorless, highly refracting, mobil liquid of narcotic odor, b_{740} 155–6°, d_0^4 0.845. *Chloroplatinate*, prisms from H_2O, m. 191–2°. *α-Naphthylurea*, fine prisms from dil. alc., m. 138°. Hemopyrrole (II), colorless liquid, b_{12} 86–7°, b_{730} 198°, d_4^0 0.930, d_4^{20} 0.918. It is unstable and gives the same reactions as its isomer. *Picrate*, long prisms or rhombic leaves from alc., m. 109°. *Chloropicrate*, hard prisms from alc., soften at 118° and decomp. 123°. *Styphnate*, fine yellow 4-sided prisms from alc., m. 120–1° (decomp.). HNO_3 gave the *methylethylmaleinimide mono-oxime*, bright yellow compact columns, m. 201°. *Phyllopyrrole* (III), leaves from Et_2O, m. 60–2° (purest prep. from chlorophyll, m. 66–7°), b_{12} 92–3°, b_{725} 213°. Extremely unstable in the air, turning rapidly to an oil and then a resin. Does not give the pine shaving reaction. *Picrate*, small prisms from alc., m. 95°. *Phyllopyrrolidine*, from phyllopyrrole by reduction with HI + red P, followed by Pt black + H. Mobil liquid, b. 160–4°, d_4^0 0.843, d_4^{20} 0.824. Odor resembles piperidine. *α-Naphthylurea*, fine needles from alc., m. 145°. B. Pyrroles from Chlorophyll.—Reduction of a large quantity of mixed chlorophyll derivs. with Sn + AcH gave pure isohemopyrrole, the purest sample of phyllopyrrole so far obtained, but the hemopyrrole was lost through resinification. Pyrroles were also obtained by reduction of a mixt. of phytochlorin and phytorhodin as above or with HI.

Alvin S. Wheeler.

Refractometric Investigations. J. F. Eykman. *Chem. Weekblad*, **8**, 651–77.—Results of a long series of measurements of refractive index made with a large number of complicated organic compds.; mainly, cyclohexanes, several 4–C and 5–C ring compds. and certain of their derivs. J. J.

Velocity of Reaction of Acetone and Lutidone with Phenylhydrazine and Hydroxylamine under Different Conditions. IV. I. Shettle. Univ. New Russia. *J. Russ. Phys. Chem. Soc.*, **43**, 1190–4.—By gradually adding small amts. of HCl or AcOH to 0.01 *N* solns. of the above ketones and PhN_2H_3 or NH_2OH at 16–8° and detg., after an hr., the amt. of unconsumed PhN_2H_3 by von Meyer's method (*Ann.*, **341**, 150) and that of NH_2OH by Petrenko-Kritchenko's method (*Ber.*, **39**, 1458) it was found that the velocity of formation (v) of the hydrazone of the AcMe decreases with the addition of HCl. With AcOH v for this hydrazone drops to 0 upon the addition of 10% AcOH, but gradually increases again upon further addition of the acid continually approaching the original value (in absence of acid). For lutidone hydrazone v rizes with the addition of HCl, while in AcOH it is 0. For AcMe oxime v falls with the increase of HCl and rizes quickly with addition of KOH (cf. Auwers, *Ber.*, **22**, 605). For the hydrazone of these ketones v is reduced to 0 by KOH. Lutidone forms an oxime under any conditions. H. M. Gordin.

Note on the Preparation of *o*-Benzopinacolin. N. Kizhner. Tomsk Techol. Inst.

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J. Russ. Phys. Chem. Soc., **42**, 1236–7.—β-Benzopinacolin is easily made by direct reduction of Ph_2CO with Sn + fuming HCl. After b. for an hr. the solid product is extracted with hot AcOEt. H. M. GORDIN.

Investigation of the Systems of Antimony Trichloride and Tribromide and Monosubstituted Benzenes. B. N. MENSHUTKIN. St. Petersburg. *J. Russ. Phys. Chem. Soc.*, **43**, 1275–1302; cf. *C. A.*, **5**, 1420 and 1434.—Pure PhMe m. —93°. The system $SbCl_3$–PhMe has one e. p. (e. = eutectic) at —94° ($SbCl_3$.215PhMe), another at 40° ($SbCl_3$.0.46PhMe), and a t. p. (t. = transition) ($SbCl_3$.PhMe ⟶ 2$SbCl_3$.PhMe) at 11° ($SbCl_3$.1.8PhMe); the *compound* $SbCl_3$.PhMe, plates or rhombs m. 15–6°, changing to the *compound* 2$SbCl_3$.PhMe, needles m. 42.5°; other compds. do not exist (cf. Rosenheim and Stellmann, *Ber.*, **34**, 3377). The system $SbBr_3$–PhMe has a e. p. at —93.5° ($SbBr_3$.358PhMe), a t. p. ($SbBr_3$.PhMe ⟶ 2$SbBr_3$.PhMe) at —1° ($SbBr_3$.3.34PhMe), and another t. p. (2$SbBr_3$.PhMe⟶ $SbBr_3$) at 30° ($SbBr_3$.1.1PhMe); the *compound* $SbBr_3$.PhMe is not very stable, it m. 9°, changing to the *compound* 2$SbBr_3$.PhMe which forms plates m. 39–9° (with sepn. of $SbBr_3$); the latter compound, exposed to the air, turns white from sepn. of $SbBr_3$ and evapn. of PhMe. The system $SbCl_3$–PhEt has one e. p. at about —93° ($SbCl_3$.830PhEt), another at 33° ($SbCl_3$.0.52PhEt), a t. p. ($SbCl_3$.PhEt ⟶ 2$SbCl_3$.PhEt) at 35° ($SbCl_3$.0.62PhEt) and another (2$SbCl_3$.PhEt⟶ $SbCl_3$) at about 37° ($SbCl_3$.0.47PhEt); the *compound* $SbCl_3$.PhEt, deliquescent rhombs m. 39°; the *compound* 2$SbCl_3$.PhEt, deliquescent needles m. 37°; on gently warming the latter it changes to the former. The system $SbBr_3$–PhEt has a e. p. at —93° ($SbBr_3$.840PhEt) and a t. p. ($SbBr_3$.PhEt ⟶ $SbBr_3$) at 29° ($SbBr_3$.1.4PhEt); there is only one *compound* $SbBr_3$.PhEt, non-hygroscopic rhombs m. 33° (separation of $SbBr_3$). The system $SbCl_3$–PhPr shows the peculiarity of having 2 solubility curves running near and almost parallel to each other This is due to the very slight difference between the temps. at which the 2 *compounds*, $SbCl_3$PhPr and 2$SbCl_3$.PhPr, begin to crystallize out. This system has a e. p. at 1° ($SbCl_3$.0.98PhPr) and a t. p. ($SbCl_3$.PhPr ⟶ 2$SbCl_3$.PhPr) at 8.5° ($SbCl_3$.0.88PhPr); the *compound* $SbCl_3$.PhPr, needles m. 1.5°; the *compound* 2$SbCl_3$.PhPr, plates m. 9–10°. The system $SbBr_3$–PhPr has a t. p. ($SbBr_3$.PhBr ⟶ $SbBr_3$) at —5° ($SbBr_3$.3.1PhBr); a e. p. could not be detd.; the *compound* $SbBr_3$.PhBr, rhombic plates m. 1° (sepn. of $SbBr_3$). Pure PhAm (Am = isoamyl) b_{772} 193–5° and smells like oranges. The system $SbCl_3$–PhAm has one t. p. ($SbCl_3$.PhAm ⟶ $SbCl_3$) at —21° ($SbCl_3$.1.3PhAm), another t. p. ($SbCl_3$.PhAm ⟶ 2$SbCl_3$.PhAm) at 33° ($SbCl_3$.3.1PhAm), and a 3rd t. p. (2$SbCl_3$.PhAm ⟶ $SbCl_3$) at —5° ($SbCl_3$.1.2PhAm); the *compound* $SbCl_3$.PhAm m. —20.5°; the *compound* 2$SbCl_3$.PhAm m. 7.5° and is not stable. The system $SbBr_3$–PhAm has a t. p. ($SbBr_3$.PhAm ⟶ $SbBr_3$) at —17°, but the compd. $SbBr_3$.PhAm could not be isolated. H. M. GORDIN.

Systems of Antimony Trichloride and Tribromide and Disubstituted Benzenes. B. N. MENSHUTKIN. St. Petersburg. *J. Russ. Phys. Chem. Soc.*, **43**, 1303–28; cf. preceding abstr.—Pure *p*-$C_6H_4Me_2$ m. 14°. The system $SbCl_3$–P (P = *p*-$C_6H_4Me_2$) has one e. p. at 7° ($SbCl_3$.4.37P), another e. p. at 11.7° ($SbCl_3$.16.1P), a t. p. ($SbCl_3$.P ⟶ 2$SbCl_3$.P) at 55° ($SbCl_3$.1.27P) and another t. p. (2$SbCl_3$.P ⟶ $SbCl_3$) at 58° ($SbCl_3$.0.18P); the *compound* $SbCl_3$.P, rhombs m. 56°, slowly deliquescent; the *compound* 2$SbCl_3$.P, m. 70°. The system $SbBr_3$–P has one e. p. at 10° ($SbBr_3$.8.5P) and another e. p. at 66.5° ($SbBr_3$.0.45P); there is only one *compound* 2$SbBr_3$.P, rhombohedrons m. 67.5°, not very deliquescent. Pure *m*-$C_6H_4Me_2$ m. —57°. The system $SbCl_3$–M (M = *m*-$C_6H_4Me_2$) has one e. p. at 36.5° ($SbCl_3$.0.41M), another e. p. at —60.5° ($SbCl_3$.26.3M), and a t. p. ($SbCl_3$.M ⟶ 2$SbCl_3$.M) at —2° ($SbCl_3$.2.14M); the *compound* $SbCl_3$.M, m. 7–8° changing to 2$SbCl_3$.M which m. 38°; both compounds are deliquescent. The system $SbBr_3$–M has a t. p. ($SbBr_3$.M ⟶ $SbBr_3$) at 12.5°

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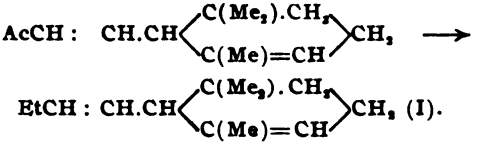
($SbBr_3$.1.1M) and a e. p. at —59.2° ($SbBr_3$.49.4M); there is only one *compound* $SbBr_3$.M m. 13.5°. The system $SbCl_3$–o (o = *o*-$C_6H_4Me_2$) has one e. p. at 31.5° ($SbCl_3$.0.450), another e. p. at —35° ($SbCl_3$.13.10) and a t. p. ($SbCl_3$.o ⟶ 2$SbCl_3$.o) at 19.5° ($SbCl_3$.o); the *compound* $SbCl_3$.o, plates m. 19°; the *compound* 2$SbCl_3$.o, rhombs m. 33.8°. The system $SbBr_3$–o has one e. p. at —33° ($SbBr_3$.28.10), and another at 22.5° ($SbBr_3$.0.920); the *compound* $SbBr_3$.o, plates m. 24°, deliquescent. The system $SbCl_3$–C (C = cymene) has a e. p. at —76.5° ($SbCl_3$.81C), a t. p. (2$SbCl_3$.C ⟶ $SbCl_3$) at 40°, ($SbCl_3$.0.52C) and another t. p. ($SbCl_3$.C ⟶ 2$SbCl_3$.C) at —3.5° ($SnCl_3$.2.43C); the *compound* 2$SbCl_3$.C, needles m. 40°; the *compound* $SbCl_3$.C, m. +5° to —6° and is stable only below 0°, easily changing to 2$SbCl_3$.C. H. M. GORDIN.

Systems of Antimony Trichloride and Tribromide and Trisubstituted Benzenes. B. N. MENSHUTKIN. St. Petersburg. *J. Russ. Phys. Chem. Soc.*, **43**, 1329–41; cf. the 2 preceding abstrs.—Pure mesitylene m. —54.4° (Ladenburg and Krügel, —57.5°, *Ber.*, 32, 1818; 13, 637). The system $SbCl_3$–M (M = mesitylene) has one e. p. at —55.6° ($SbCl_3$.126.2M), and another at 58.5° ($SbCl_3$.0.15M) and a t. p. ($SbCl_3$.M ⟶ 2$SbCl_3$.M) at 38° ($SbCl_3$.1.8M); the *compound* 2$SbCl_3$.M, rhombs, m. 75.5°; the *compound* $SbCl_3$.M, plates m. 43° changing to the preceding; both compds. are not hygroscopic. Solns. of $SbCl_3$ in M have a raspberry color, and the color is more intense when the amt. of $SbCl_3$ is small. The system $SbBr_3$–M has a e. p. at —55.2° ($SbBr_3$.147M), another e. p. at 69° ($SbBr_3$.0.42M) and a t. p. ($SbBr_3$.M ⟶ 2$SbBr_3$.M) at 29° ($SbBr_3$.3.45M); the *compound* 2$SnBr_2$.M, plates m. 69.5°; the *compound* $SbBr_3$.M, rhombs combined with other forms, m. 38–9° changing to the preceding. The color of solns. of $SbBr_3$ in M is even more intense than that of $SbCl_3$ in M. Pure pseudocumene m. —57.4°. The system $SbCl_3$–P (P = pseudocumene) has a t. p. ($SbCl_3$.P ⟶ 2$SbCl_3$.P) at —5° ($SbCl_3$.1.83P), a e. p. at —60° ($SbCl_3$.8.25P) and another e. p. at 51° ($SbCl_3$.0.27P); the *compound* 2$SbCl_3$.P m. 56°; the *compound* $SbCl_3$.P crystallizes only when its soln. is cooled below —60°, exists only below 0°, and m. a little above 0°, changing to the preceding. The system $SbBr_3$–P has a e. p. at —58.8° ($SbBr_3$.28P), one t. p. ($SbBr_3$.P ⟶ 2$SbBr_3$.P) at —7° ($SbBr_3$.1.72P) and another t. p. (2$SbBr_3$.P ⟶ $SbBr_3$) at 33° ($SbBr_3$.0.8P); the *compound* 2$SbBr_3$.P, long plates m. 36° (decomp.), the *compound* $SbBr_3$.P is produced only below —58.8° and m. 13°. H. M. G.

Compounds of Aluminium Chloride and Bromide with Acyl Chlorides. B. N. MENSHUTKIN. St. Petersburg. *J. Russ. Phys. Chem. Soc.*, **42**, 1310–8.—Pure BzCl m. —0.5° (Lieben, —1°; *Ann.*, 178, 43). The system $AlCl_3$–BzCl has a eutectic at —7.5° ($AlCl_3$.6.53BzCl); the compd. $AlCl_3$.BzCl, long colorless needles m. 93° (Perrier, 87–90°; *Compt. rend.*, 116, 1298; Perrier, *Combinaisons*, 18). The system $AlBr_3$–BzCl has one eutectic at —5° ($AlBr_3$.6.66BzCl) and another at about 7–8° ($AlBr_3$.0.54BzCl); the *compound* $AlBr_3$.BzCl, long needles m. 90°. H. M. GORDIN.

Decomposition of Alkylidene Hydrazines. XXXII. Transformation of Ionone and Pseudoionone into the Corresponding Hydrocarbons, $C_{13}H_{22}$. N. KIZHNER. *J. Russ. Phys. Chem. Soc.*, 43, 1398–1402.—*Ionane* (I) was made by b. ionone with $(NH_2)_2.H_2O$ and decomp. of the resulting base with KOH:



The decomp. with KOH is an exothermic reaction, so that it is only necessary to warm the mixt. to the beginning of the evolution of N. (I) is a colorless liquid of a turpentine-like odor; b_{747} 220–1; d_0^{20} 0.853; n_D 1.4784; its soln. in Ac_2O is colored raspberry-

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red by a drop of H_2SO_4; is oxidized by the air, gradually becoming yellow; absorbs 4 ats. Br; that it does not correspond to β-ionone is shown by the value of the MR calc. from that of the n_D. By the same method pseudoionone was changed to *pseudoionane:* $AcCH : CHCH : CMe(CH_2)_3CH : CMe_2 \longrightarrow EtCH : CH : CHCH : CMe(CH_2)_2.CH : CMe_2$. The action of KOH in this reaction is also exothermic; colorless liquid of a slight odor; b_{757} 224.5°; d_0^{20} 0.8151; n_D 1.4725; quickly turns yellow in the air; absorbs 6 ats. Br; is not affected by b. dilute H_2SO_4 (25%), but on b. its soln. in AcOH containing 2.5% H_2SO_4 it isomerizes to (I). H. M. GORDIN.

Polymerization of Ethylene Hydrocarbons at High Temperatures and Pressures. V. IPAT'EV. *J. Russ. Phys. Chem. Soc.*, 43, 1420–30.—I. was first to show that at high temps. and pressures C_2H_4 condenses to a liquid (*Ibid.*, 38, 63). It is now shown that under a pressure of 70 atm. the polymerization of C_2H_4 begins at 325°, and is very fast at 380–400°, the pressure diminishing 5 atms. per min. The heating is stopped when the contraction of vol. ceases. On cooling the pressure is 25–30 atms. The product consists of a very small amt. of solids and a gray greenish liquid of the comp. 52.8% C_nH_{2n}, 4.2% H and 43% CH_{n2n+2}. By fractionation and treatment with Br and H_2SO_4 the liquid yielded pentane, hexane, octane, nonane, nonnaphthene, decanaphthene, endecanaphthene, dodecanaphthene, tetradecanaphthene, pentadecanaphthene, amylene, hexylene, a mixt. of hydrocarbons containing less H than the polymethylenes, and another mixt. of hydrocarbons b. above 280°. C_6H_6 derivs. were not found. Heated under the same conditions, but in presence of Al_2O_3, C_2H_4 gave almost twice as much of the mixt. b. above 280°; otherwise the product contained the same polymethylenes, but less of the satd. hydrocarbons. Under the same conditions isobutylene yielded in general similar products, but the lower fractions contained more hydrocarbons with a C_2H_4 union, (due to formation of di- and tri-isobutylene), and the higher fractions contained less hydrocarbons, having less H than the polymethylenes. High temps. alone do not polymerize C_2H_4; at ordinary pressure it remains unchanged even at 600°, while still higher temps. decompose both satd. hydrocarbons and polymethylenes (cf. following abst.). The formation of polymethylenes is probably due to the C_2H_4 changing to $(CH_2)_6$ derivs. (as C_2H_2 changes to C_6H_6), and that of olefins either to direct polymerization or to ring opening of the polymethylenes (cf. following abst.). The production of satd. hydrocarbons is due either to hydrogenation of the polymethylenes accompanied by a ring opening or to a removal of side chains from the polymethylene nucleus. The fact that Engler obtained similar products from amylene and hexylene (*C. A.*, 4, 767) may be explained by assuming that part of these olefins break down to C_2H_4, while another part directly polymerizes to derivs. of $(CH_2)_6$. The formation of polymethylenes and satd. hydrocarbons from C_2H_4 may be of service in the hypothesis of the organic origin of petroleum. H. M. GORDIN.

Catalytic Reactions at High Temperatures and Pressures. XXVIII. Decomposition of Hexane and Hexamethylene. Isomerization of Hexamethylene. V. IPAT'EV AND N. DOVGELEVICH. *J. Russ. Phys. Chem. Soc.*, 43, 1431–6.—The products obtained by passing hexane and $(CH_2)_6$ under ordinary pressure through an Fe tube at 650–700° with or without catalyzers (Al_2O_3, Zn dust or reduced Cu) consisted of a mixt. of gas and liquid; the former contained 44–50% C_nH_{2n} (C_2H_4, C_3H_6 and probably C_4H_8), 8.4–14% H and 41.6–44% C_nH_{2n+2}; the latter contained some satd. and small amts. of unsatd. hydrocarbons. Hexane decomposes more easily than $(CH_2)_6$, and Al_2O_3 considerably promotes the decomp. Under pressure the decomp. of hexane and $(CH_2)_6$ begins already at 500°, and in the case of the former proceeds with such explosive violence that the work with it had to be dropped. $(CH_2)_6$ was heated in the presence of Al_2O_3 (3 g. for 40 g. hydrocarbon) to 500–10° under a pressure of 110–20 atms. for 4 hrs. After cooling the pressure was about 15 atms. The product con-

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sisted of a mixt. of gas and liquid. More prolonged heating diminishes the amt. of liquid. The gas contained 3.8% C_nC_{2n}, 22.4% H and 73.5% CH_4. The liquid was treated with H_2SO_4 and fractionated into 9 fractions. The fractions b. 210–80° contained polycyclic hydrocarbons; the fractions b. 92–170° contained C_6H_6 derivs. while the fractions b. 45–80° contained methylpentamethylene (b. 71–3°). The constitution of the latter is proved by its giving a tertiary nitro compd. (b. 179–81°) $CH_2.CH_2$ | $CH_2.CH_2$ >$CMe(NO_2)$. The transformation of $(CH_2)_6$ into the more stable 5-membered ring is due to the catalytic action of Al_2O_3 under the joint influence of high temp. and pressure, since high temp. alone is incapable of inducing this transformation.

H. M. GORDIN.

History of Ricinoleic Acid. B. KHONOVSKII. *J. Russ. Phys. Chem. Soc.*, **43**, 1457–77.—When ricinoleic acid (I) is treated with HI the product is not as Claus supposed iodostearidinic acid, $C_{18}H_{33}IO_2$ (*Ber.*, **9**, 1916), but *diiodostearic acid*, $C_{18}H_{34}I_2O_2$ (II). The ability of Claus' product to take up Br must be ascribed to his acid having contained some unchanged (I). Reduced with Zn + AcOH (II) changes to stearic acid. Since dihalogen derivs. of aliphatic acids with the halogen ats. at adjacent C ats. usually are reduced to unsatd. acids, the 2 I ats. in (II) must be differently situated. This, in connection with other considerations (*Ber.*, **27**, 3121; *J. Russ. Phys. Chem. Soc.*, **32**, 149), suggest for (I) the formula $Me(CH_2)_5CH(OH)CH_2CH : CH(CH_2)_7CO_2H$, and for (II) either $Me(CH_2)_5CHI(CH_2)_2CHI(CH_2)_7CO_2H$ or $Me(CH_2)_5CHICH_2CHI(CH_2)_8CO_2H$. By the action of KOH in alc. (II) changes to an *isomer* of *linoleic acid* (III), differing from linoleic acid in not giving, upon oxidation with $KMnO_4$, tetrahydroxystearic acid, but a tarry mass from which azelaic acid could be isolated. (III) yields a *tetrabromide*, $C_{18}H_{32}Br_4O_2$ (thick dark-colored liquid losing HBr on standing), a *barium salt*, gray powder, and a *silver salt*. (III) can also be made by the action of anhydrous $ZnCl_2$ on the Zn salt of (I) at high temps. On heating a soln. of the Na salt of (II) in alc. with ZnO to 150° a *product* was obtained which yielded 2 Ba salts, one (A) sol., the other (B) insol. in Et_2O. From (B) a *product* (IV) in shining leaflets m. 108–14° was obtained which seemed to be a mixt. of either 2 oxyoleic acids: $Me(CH_2)_5CH(CH_2)_2CH(CH_2)_7CO_2H$ (V) and $Me(CH_2)_5CHCH_2CH(CH_2)_8CO_2H$, or of one of these with a keto acid, $Me(CH_2)_7CO(CH_2)_8CO_2H$. Against the latter assumption speaks the fact that (IV) gives no oxime with NH_2OH. (IV) gives a *sodium salt*, white leaflets, a *barium salt*, white powder, and a *silver salt*, granular cryst. From (A) an acid was obtained having either a triple union or 2 double unions $Me(CH_2)_5CH : CHCH : CH(CH_2)_7CO_2H$ (VI). By treating (II) with AgOH a little of (VI) was obtained, together with a *dihydroxystearic acid* (VII), m. 115–6°, solidif. 111–109°; *barium*, *silver* and *sodium* salts and a *diacetyl compound*. Recovered from the latter (VII) m. 116–7° and solidif. 114–3°. Reduction changes (VII) to stearic acid. (IV) was also obtained by the action of cold H_2SO_4 on (I), and (VII) by treating this product with Ac_2O and sapong. the acetate. (VII) is not identical with the compds. of the same formula obtained from oleic, isoöleic and elaidic acids.

H. M. GORDIN.

Relation between the Configuration and Rotation of the Lactones in the Sugar and Saccharinic Acid Groups. E. ANDERSON. *J. Am. Chem. Soc.*, **34**, 51–4.—It is shown that the relation pointed out by Hudson (*C. A.*, **4**, 1466) between configuration and rotation holds good also for practically all monobasic and some dibasic acid lactones in the sugar and saccharinic acid groups. 18 examples are given.

STUART J. BATES.

2,5-Dimethylheptane. L. CLARKE AND S. A. BEGGS. *J. Am. Chem. Soc.*, **34**,

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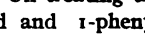
54–60.—5-Methyl-2-hexanone is converted by the Barbier-Grignard reaction into *2,5-dimethyl-5-heptanol*, colorless liquid, b. 172–4°. This with P and I gave *2,5-dimethyl-5-iodoheptane*, which on gentle heating with alc. KOH gave *2-methyl-5-methene-heptane*, colorless liquid with petroleum-like odor, b. 139–40°. On passing this over freshly reduced Ni at 160–80°, *2,5-dimethyl heptane* was obtained, colorless liquid, petroleum-like odor, b. 135.6–5.9°, d_{15}^{15} 0.7190, n_D^{25} 1.4020. STUART J. BATES.

2,4-Dimethylheptane. L. CLARKE AND S. A. BEGGS. *J. Am. Chem. Soc.*, **34**, 60–2.—Me isobutyl ketone and PrMgI yield *2-methane-4-methylheptane*, colorless liquid, b. 132–3°. When passed over freshly reduced Ni at 160–80° this yields *2,4-dimethylheptane*, colorless liquid b_{752} 132.9–3°, d_{15}^{15} 0.7206, n_D^{25} 1.4014. STUART J. BATES.

Molecular Rearrangements in the Camphor Series. VIII. Camphonolic Acid and Campholoactone. W. A. NOYES, E. E. GORSLINE AND R. S. POTTER. Univ. Ill. *J. Am. Chem. Soc.*, **34**, 62–7.—The method of preparing camphononic acid was improved, m. 229–30°, $[\alpha]_D^{27.5}$ in C_6H_6 (0.024 g. in 1 cc.) + 17.8°, $[\alpha]_D^{28}$ in alc. (0.02 g. in 1 cc.) —3.9°. On reduction this acid yielded *amyl camphonolate* $C_8H_{14}(OC_5H_{11})$-CO_2H, b_{40} 222–3°. *Copper salt* of ester, *silver salt*. *Cis*-camphonololactone was prepared from the nitroso deriv. of aminolauronic anhydride (Noyes and Taveau, *Am. Chem. J.*, **35**, 385) and found to be identical with that which Bredt obtained by the reduction of camphononic acid (*C. A.*, **3**, 2797). The lactone which m. 165–7°, $[\alpha]_D^{28}$ in alc. (0.05 g. in 1 cc.) —20.2°, $[\alpha]_D^{26}$ in alc. (0.1 g. in 1 cc.) —22.3°, was converted back to the hydroxy acid by heating at 225°. *Cis*-camphonolic acid m. 202–3°, $[\alpha]_D^{28}$ in alc. (0.1 g. in 1 cc.) 29.2°, was oxidized to camphononic acid. STUART J. BATES.

Correlation of Ionization and Structure. II. Negatively Substituted Benzoic Acids. C. G. DERICK. Univ. Ill. *J. Am. Chem. Soc.*, **34**, 74–82.—In a manner similar to that previously presented (*C. A.*, **5**, 2811) for aliphatic acids, place factors for negative radicals in aromatic acids have been calc. It is found that the effect of substituting groups in the nucleus, of the log of the ionization const. (*K*) of the acid, is additive, *i. e.*, that knowing the place factors, *K* for a substituted acid of known structure may be calc. and that also if *K* is known the positions of the substituent with respect to the carboxyl may be detd. The effect on *K* of a 3,5-disubstitution is just twice that of a 3- or 5-substitution; hence a new proof is given of the equivalence of positions 3 and 5 with respect to position 1. STUART J. BATES.

Formation of Pyrimidines by Use of Nitromalonic Aldehyde. WILLIAM J. HALE AND HARVEY C. BRILL. Univ. Michigan. *J. Am. Chem. Soc.*, **34**, 82–94.—Urea and Na nitromalonic aldehyde in H_2O condence in presence of a little piperidine to *nitromalonic aldehyde monoureide*, $NH_2CON : C_2H_2(NO_2)CHO$, m. 154° (cor.). *Sodium salt* + *3 H_2O*. On passing dry HCl into an alc. soln. of nitromalonic aldehyde nonanil and urea, there appeared *nitromalonic aldehyde ureideanil*, $PhN : CCH(NO_2)CH{:}NCONH_2$, red, needle-like crystals m. 211° (cor.). *Nitromalonic aldehyde ureideoxime*, yellow leaf-like crystals, m. 174–5° (cor.). On treating the monoureide with phenylhydrazine, the urea nucleus was displaced and 1-phenyl-4-nitropyrazole resulted. The mother liquor from the nitromalonic aldehyde monureide on standing slowly deposited *5-nitro-2-hydroxypyrimidine*, HOC : NCH : CNO_2, small yellow plates, m.



203.5° (cor.). *Sodium salt* + *2 H_2O*, red crystals. *Potassium salt* + *H_2O*, yellow prismatic crystals. *Barium salt* + *4 H_2O*, reddish brown. *Silver salt*, reddish yellow color. On warming the Na salt with MeI in alc., *5-nitro-2-methoxypyrimidine*, plate-like crystals m. 168–9° (cor.). Benzamidine hydrochloride, and Na nitromalonic aldehyde in H_2O gave *5-nitro-2-phenylpyrimidine*, soft plates m. 219° (cor.). Guanidine carbonate and Na nitromalonic aldehyde in presence of a little piperidine give a

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quant. yield of *5-nitro-2-aminopyrimidine*, colorless needles, m. 236° (cor.); on b. with alkali, NH_3 is evolved. *5-Nitro-2-acetylaminopyrimidine*, crystals, m. 172–5° (cor.). On adding a little KOH to 5-nitro-2-aminopyrimidine in CS_2, *5,5'-dinitro-2,2'-dipyrimidylthiocarbamide*, leaflets, m. 230–1° (cor.) was obtained. *Nitromalonic aldehyde monophenylureide*, cryst., 176–7° (cor.). *Nitromalonic aldehyde monobenzylureide*, cryst., m. 150–1° (cor.). *Nitromalonic aldehyde monomethylureide*, yellow crystals. STUART J. BATES.

Recognition of the Isomerism of the Alkoxy Derivatives of Malachite Green. E. VOTOCEK AND J. MATEJKA. Prague. *Chemické Listy*, **5**, 200–4.—Procedures for the synthesis of the following are described: *p*-Methoxymalachite-green, *p*-ethoxytetramethyldiaminotriphenylmethane; *o*-, *p*- and *m*-methoxymalachite-green. P. J. HANZLIK.

Synthesis of Lactic Aldehyde. CYRILL KRANZ. Prague. *Chemické Listy*, **5**, 323–7.—The new product compares favorably in color, odor, taste (m. p. 101–2°) and solubility with a hydroxypropionic aldehyde. It is optically inactive and yields a phenylmethylglyoxal, m. p. 145–7°. P. J. HANZLIK.

Decomposition of Hydrazides and Hydrazones by Heat. FREDERICK D. CHATTAWAY, CHARLES L. CUMMING AND BERNARD H. WILSDON. Chem. Lab., Univ. Oxford. *J. Chem. Soc.*, **99**, 1950–3; *Proc. Chem. Soc.*, **27**, 193.—At 346°, phthalylphenylhydrazide gives phthalanil, N and NH_3. Phthalyl-*p*-bromophenylhydrazide forms phthal-*p*-bromoanil. Phthalyl-*p*- and *o*-tolylhydrazides behave in the same way. Benzaldehydephenylhydrazone decomps. chiefly into benzylideneaniline, N and NH_3, but the remainder gives stilbene, N and C_6H_6. Benzaldehyde-*p*- and *o*-tolylhydrazones behave similarly. J. BISHOP TINGLE.

Absorption Spectra of Triketohydrindene Hydrate and Certain Derivatives. JOHN E. PURVIS. Chem. Lab., Univ. Cambridge. *J. Chem. Soc.*, **99**, 1953–60; *Proc. Chem. Soc.*, **27**, 242; cf. Ruhemann, *C. A.*, **4**, 3079; **5**, 3674.—The absorption spectra of the following compds. have been investigated, the first 5 in abs. alc., the others in glacial AcOH, the results being represented in curves: Triketohydrindenehydrate, colorless; triketohydrindenediphenylhydrazone, red; 2,3-*bis*-[*p*-dimethylaminoanilo]-*α*-hydrindone, very dark purple; ketohydrindenophenazine, canary-yellow; 2-*o*-carboxybenzoylindoneglyoxaline, carmin-red; 1,3-diketohydrindamine, yellow; 1,3-diketo-2-benzylidinehydrindamine, dull orange; 1,3-diketo-2-anisylidenehydrindamine, vermillion-orange; 1,3-diketo-2-*p*-dimethylaminobenzylidenehydrindamine, maroon, or very dark red; diketohydrindylenediketohydrindamine and its NH_4 salt, both deep red. The results show that the color of the compds. is intimately connected with the presence of ketonic groups. The shade of color is modified according to the type of the substituting groups. Where another ring is established, as in compds. 4 and 5, there is no selective absorption, the color is produced by an extension of the general absorption within the regions of visible spectrum. J. BISHOP TINGLE.

Alkaline Condensations of Nitrohydrazo Compounds. I. ARTHUR G. GREEN AND ERNEST A. BEARDER. Dept. of Tinctorial Chem., Univ. Leeds. *J. Chem. Soc.*, **99**, 1960–72; *Proc. Chem. Soc.*, **27**, 228.—*4,4'-Dinitrohydrazobenzene*, $O_2NC_6H_4NHNHC_6H_4NO_2$, from 4,4'-dinitroazobenzene and colorless $(NH_4)_2S$; pale yellow prisms, m. 228° (quick heating). Yield, 54–63% of the azo compd. *Diacetyl derivative*, plates, m. 188–9°. *4,4'-Nitronitrosohydrazobenzene* from the dinitrohydrazobenzene and aq. NaOH; orange-red cubes with a violet reflex. decomp. 203°. It dyes silk red, changing to blue with NaOH. With alkali, or neutral solvents it gives *bisnitrobenzeneazoazobenzene*, $O_2NC_6H_4N_2C_6H_4N_2C_6H_4N_2C_6H_4NO_2$; orange needles, or leaflets, m. 285–6°. Yield, quant. J. BISHOP TINGLE.

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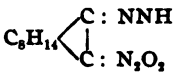
Trimercuridiethylammonium Nitrite. PRAFULLA C. RAY AND JITENDRA N. RAKSHIT. Chem. Lab., Presidency College, Calcutta. *J. Chem. Soc.*, **99**, 1972–3; *Proc. Chem. Soc.*, **27**, 220.—Mercuric sodium nitrite, $EtNH_2$ and H_2O form *trimercuridiethylammonium nitrite*, $N_2Hg''_3Et_2(NO_2)_2.H_2O$ (cf. *C. A.*, **5**, 3673). J. B. T.

Studies in the Camphane Series. XXX. Constitution of Pernitrosocamphor (Camphenylnitroamine). MARTIN O. FORSTER, JOHN R. TROTTER AND JACOB WEINTRAUBE. Royal College of Science, South Kensington, London. *J. Chem. Soc.*, **99**, 1982–92; *Proc. Chem. Soc.*, **27**, 259.—*Pernitrosocamphorquinonephenylhydrazone* formula (I) below, from K pernitrosocamphor and phenyldiazonium chloride; golden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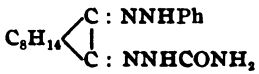
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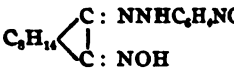
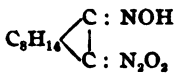

(III)

brown crystals, m. 104°. With $HONH_2$ it gives camphorquinonephenylhydrazone-oxime. *Camphorquinonephenylhydrazonesemicarbazone*, (II), from (I) and semicarbazine acetate; golden yellow, 6-sided plates, m. 268°. *Pernitrosocamphorquinone-p-nitrophenylhydrazone*, like (I); yellow prisms, m. 96°. *Oxime* (III), brown needles, m. 186°. *Semicarbazone*, golden yellow plates, m. 250° (decomp.). *Pernitrosocamphorquinone-p-bromophenylhydrazone*, golden yellow prisms, m. 143°; in $CHCl_3$, $[\alpha]_D$ 301.0°. Also yellow prisms, m. 159°; in $CHCl_3$, $[\alpha]_D$ 312.3° falling to 235.5°. The forms differ in color reactions and in solubilities. *Oxime*, from the higher m. form; primrose prisms, m. 180°; in $CHCl_3$, $[\alpha]_D$ 215.5°. *Semicarbazone*, also from the higher m. form; brown, 6-sided plates, m. 265°. *Pernitrosocamphorquinoneoxime* (*pernitrosoisonitrosocamphor*) (IV), from K pernitrosocamphor and NOCl; needles, or fern-like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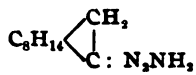
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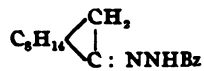
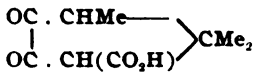
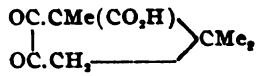

(VI)

crystals, m. 147.5°; in $CHCl_3$, $[\alpha]_D$ 103.1°. *Benzoyl derivative*, 6-sided prisms, becomes yellow and decomp. 174°; in $CHCl_3$, $[\alpha]_D$ 84.7°. Alc. NaOH, or H_2S + NH_3 converts pernitrosocamphor into camphor. Pernitrosocamphor and N_2H_4 form camphorazine-camphorhydrazone (V) being probably the primary product. *Camphorbenzoylhydrazone* (VI), from pernitrosocamphor and benzoylhydrazine; needles, m. 171°; in $CHCl_3$, $[\alpha]_D$ —50.5°. J. BISHOP TINGLE.

Komppa's Synthesis of Camphoric Acid. GUSTAVE L. BLANC AND JOCELYN F. THORPE. Sorbonne, Paris and Sorby Research Lab., Univ. Sheffield. *J. Chem. Soc.*, **99**, 2010–2; *Proc. Chem. Soc.*, **27**, 265; *Bull. soc. chim.*, **9**, 1068–9; cf. Komppa, *C. A.*, **5**, 1090, 2252.—*3,4-Diketo-1,1,2-trimethylcyclopentane-5 (or 2) -carboxylic acid*


(I)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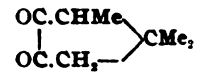
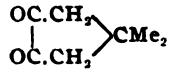

(III)

formula (I) or (II) below, is formed from Me diketocamphorate and aq. KOH (10%): needles, m. 146° (CO_2 evolution). *3,4-Diketo-1,1,2-trimethylcyclopentane* (III), from (I) at 160°; needles, m. 83°. It is chiefly enolic and sublimes 70°. *Potassium salt*. *Phenylosazone*, $C_{20}H_{24}N_4$; yellow prisms, m. 162°. *Dioxime*, needles, m. 172° (decomp.). *3,4-Diketo-1,1-dimethylcyclopentane* (IV), from Me diketoapocamphorate


(IV)

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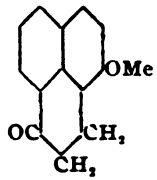
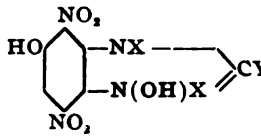
and dil. H_2SO_4; needles, m. 45°. *Potassium salt*, plates. *Phenylosazone*, $C_{16}H_{22}N_4$ yellow needles, m. 167°. These results show that the authors' previous criticism of Komppa's conclusions was unfounded. J. Bishop Tingle.

β-2-Methoxynaphthylpropionic Acid and Methoxyperinaphthhydrindone. George Barger and Walter W. Starling. Chem. Lab., Goldsmiths' Col., New Cross, London. *J. Chem. Soc.*, **99**, 2030–3; cf. Sachs and Brigl, *C. A.*, **5**, 3427.—*2-Methoxynaphthaldehyde* from β-hydroxynaphthaldehyde and Me_2SO_4; m. 84°; b_{18} 205°. Yield, 95%. With Na and AcOEt it gives *β-2-methoxynaphthylacrylic acid*, $MeOC_{10}H_6CH{:}CHCO_2H$; pale yellow needles, m. 160°. With PCl_5 it gives naphthacoumarin. It is reduced by Na-Hg to *β-2-methoxynaphthylpropionic acid*, $MeOC_{10}H_6CH_2CH_2CO_2H$; needles, m. 128°. Yield, very small. C_6H_6 and P_4O_{10} convert it into *methoxyperinaphthhydrindone*, deep yellow prisms, m. 135°. It evolves MeI with b., aq. KI.



Yield, very poor. J. Bishop Tingle.

Syntheses with Phenol Derivatives Containing a Mobil Nitro Group. V. Quinoneimides, Asymmetric Quaternary Ammonium Compounds and Asymmetric Carbinols Continued. Raphael Meldola and Harold Kuntzen. City and Guilds of London Techn. Col., Finsbury. *J. Chem. Soc.*, **99**, 2034–45; cf. *C. A.*, **5**, 3564.—The object of the investigation was to study the influence of the radicles X, Y and Z in imineazolinium compds. of the type 

Imineazole from trinitroacetylaminophenol and *p*-anisidine. The imineazole and MeI give an *imineazolium iodide*; ochreous needles. *4,7-Dinitro-1-p-anisyl-2,3-dimethyl-6-benzimineazolone*, $C_{16}H_{14}O_6N_4$, brick-red, microcryst. powder. *4,7-Dinitro-6-hydroxy-1-p-anisyl-2,3-dimethylbenzimineazolium chloride*, $C_{16}H_{14}O_6N_4.HCl$, needles. *4,7-Dinitro-6-hydroxy-1-p-anisyl-2,3-dimethyl-2-benzimineazoleol*, $C_{16}H_{16}O_7N_4$, ochreous, microcryst. powder. Imineazole from trinitroacetylaminophenyl and *p*-chloroaniline. *Methiodide*, dark, ochreous scales. *4,7-Dinitro-1-p-chlorophenyl-2,3-dimethyl-6-benzimineazolone*, ochreous scales, not decomp., 300°. *4,7-Dinitro-6-hydroxy-1-p-chlorophenyl-2,3-dimethylbenzimineazolium chloride*, $C_{15}H_{12}O_5N_4Cl_2$, microcryst. powder. *4,7-Dinitro-6-hydroxy-1-p-chlorophenyl-2,3-dimethyl-2-benzimineazoleol*, $C_{15}H_{12}O_6N_4Cl$, ochreous, microcryst. powder. Imineazole from trinitropropionylaminophenol and aniline. *2,3,5-Trinitro-4-propionylaminophenol*, $C_9H_8O_8N_4$, ochreous needles, m. 178–9°. *4,7-Dinitro-6-hydroxy-1-phenyl-2-ethylbenzimineazole*, $C_{15}H_{12}O_5N_4$, ochreous plates, becomes opaque 100°, m. 173°. *4,7-Dinitro-6-hydroxy-1-phenyl-2-ethyl-3-methylbenzimineazolium iodide*, reddish brown scales. *4,7-Dinitro-1-phenyl-3-methyl-2-ethyl-6-benzimineazolone*, $C_{16}H_{14}O_5N_4$, brick-red scales, decomp. above 300°. *4,7-Dinitro-6-hydroxy-1-phenyl-2-ethyl-3-methylbenzimineazolium chloride*, $C_{16}H_{13}O_5N_4Cl$, granules. *4,7-Dinitro-6-hydroxy-1-phenyl-3-methyl-2-ethyl-2-benzimineazoleol*, $C_{16}H_{16}O_6N_4$, ochreous needles. Imineazole from trinitroisovalerylamino-phenol and aniline. *Dinitroisovaleryl-p-aminophenol*, $C_{11}H_{12}O_6N_2$, from diisovaleryl-

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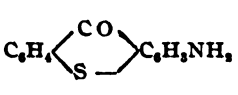
p-aminophenol, HNO_2 and glacial AcOH; ochreous needles, m. 177°. *2,3,5-Trinitro-1,4-diisovalerylaminophenol*, $C_{16}H_{20}O_8N_4$, from isovaleric anhydride and *p*-aminophenol; pale yellow needles, m. 119°. *4,7-Dinitro-6-hydroxy-1-phenyl-2-isobutylbenzimineazole*, $C_{17}H_{16}O_5N_4$, ochreous scales, m. 156°. *4,7-Dinitro-6-hydroxy-1-phenyl-2-isobutyl-3-methylbenzimineazolium iodide*, orange-red needles. *4,7-Dinitro-1-phenyl-3-methyl-2-isobutyl-6-benzimineazolone*, orange, microcryst. powder, decomp. above 300°. *4,7-Dinitro-6-hydroxy-1-phenyl-3-methyl-2-isobutyl-2-benzimineazoleol*, $C_{18}H_{20}O_6N_4$, ochreous needles. *4,7-Dinitro-6-hydroxy-1-phenyl-2-isobutyl-3-methylbenzimineazolium chloride*, white needles. IMINEAZOLE FROM TRINITROACETYLAMINOPHENOL AND BENZYLAMINE, *Methiodide*, red, ochreous scales. *4,7-Dinitro-1-benzyl-2,3-dimethyl-6-benzimineazolone*, $C_{16}H_{14}O_5N_4$, bright red needles, m. 252–3° (decomp.). *4,7-Dinitro-6-hydroxy-1-benzyl-2,3-dimethyl-6-benzimineazolium chloride*, pale ochreous, microcryst. powder, m. 218°. The views expressed previously regarding the constitution of the above classes of compds. are considered and are maintained. J. BISHOP TINGLE.

Synthesis of Derivatives of Thioxanthone. IV. Synthesis from Aromatic Sulfinic Acids. HAROLD CHRISTOPHER AND SAMUEL SMILES. Org. Chem. Lab., Univ. College, London. *J. Chem. Soc.*, 99, 2046–51; cf. *C. A.*, 5, 3676.—2-Aminothioxanthone, formula (I) below, from *m*-amino benzoic acid and benzenesulfinic acid,



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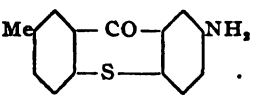
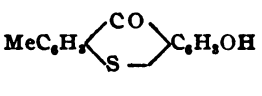


(II)

m. 222°. *2-Amino-7-methylthioxanthone* (II), from *m*-aminobenzoic acid and *p*-toluenesulfinic acid; orange needles, m. 190°. Yield, very poor. *2-Hydroxy-7-methylthioxanthone* (III), from *m*-hydroxybenzoic acid and *p*-toluenesulfinic acid; lemon-yellow needles, m. 217°. *Sodium salt*, orange needles. *2-Hydroxy-5-methylthioxanthone* (IV), from *m*-hydroxybenzoic acid and *o*-toluenesulfinic acid; yellow needles,



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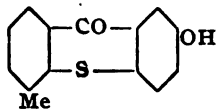

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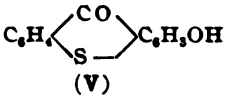
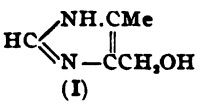
m. 211°. *Hydroxythioxanthon* (V), from *o*-thiolbenzoic acid, PhOH and H_2SO_4;



(V)

lemon-yellow needles, m. 243°. *Sodium salt*, orange. J. BISHOP TINGLE.

Some Derivatives of 4-(or 5)-Methylglyoxaline. ARTHUR J. EWINS. Wellcome Physiol. Research Labs., London. *J. Chem. Soc.*, 99, 2052–9.—*4-(or 5)-Methyl-5-(or 4)-hydroxymethylglyoxaline*, formula (I) below, from 4-(or 5)-methylglyoxaline



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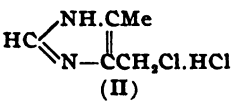

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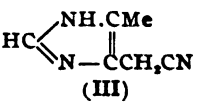

(III)

and aq. HCHO; prisms, m. 138°. Yield, 180% of the glyoxaline. *Phosphotungstate*, prisms. *Hydrochloride*, plates, m. 240–2°. *Picrate*, prisms, m. 180–1°. *4-(or 5)-Methyl-5-(or 4)-chloromethylglyoxaline hydrochloride* (II), from $POCl_3$ and the hydrochloride of (I); plates, m. 222°. Yield, quant. With KCN it gives *4-(or 5)-methyl-*

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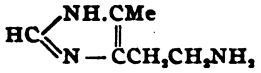
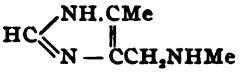
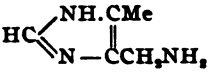
5-(or 4)-cyanomethylglyoxaline (III); prisms, m. 163–4°. Yield, 24%. *Phosphotungstate*, needles. *Picrate*, prisms, m. 172°. *4-(or 5)-Methyl-5-(or 4)-β-aminoethylglyoxaline* (IV), from (III), Na and abs. alc. Yield, 22%. *Picrate*, cryst. *Dihydro-*



(IV)



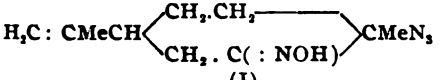
(V)



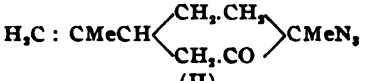
(VI)

chloride, needles, m. 231–2°. *Dihydrobromide*, prisms, m. 212°. *Phosphotungstate*. *4-(or 5)-methyl-5 (or 4)-methylaminomethylglyoxaline* (V), from (II) and aq. $MeNH_2$. *Dipicrate*, prisms, m. 222°. Yield, 20%. *Dihydrochloride*, prisms, m. 246–7°. *4-(or 5)-Methyl-5-(or 4)-aminomethylglyoxaline* (VI) from (II) and aq. NH_3. Yield, 10%. *Dipicrate*, prisms, m. 216–7°. *Hydrochloride*, prisms, m. 233–4°. J. B. T.

Triazo Group. XIX. Nitrosoazides of Dipentene, *d*-Limonene and *l*-Limonene. MARTIN O. FORSTER AND FREDERIK M. VAN GELDEREN. Royal Col. Science, South Kensington, London. *J. Chem. Soc.*, **99**, 2059–68; *Proc. Chem. Soc.*, **27**, 195.—*Dipentene nitrosoazide*, formula (I) below, from dipentene nitrosate, or nitrosochloride

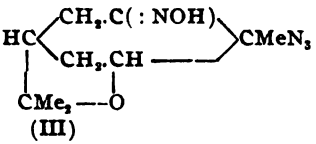


(I)



(II)

and NaN_3; plates, m. 72–3°. Alc. alkali hydroxides convert it into *dl*-carvoxime. *Phenylcarbamyl derivative*, $C_{10}H_{18}(:NOCONHPh)N_3$, needles, m. 113–4°. *dl-Triazodihydrocarvone* (II), from $C_2H_2O_4$ and (I); liquid, $b_{0.4}$ 81°; d^{20} 1.0409. With $HONH_2$.AcOH it regenerates (I). *Semicarbazone*, m. 132–3°. Al-Hg reduces (II) to dihydrocarvone and a basic *compound*, in small quantity; m. 125°. *Chloroplatinate*, decomp. 217°. *d-Limonene nitrosoazide* from either the α- or β-nitrosochloride; crystals, m. 52–3°; in $CHCl_3$, $[\alpha]_D$ 6.5°. Yield, 20–40%. *Phenylcarbamyl derivative*, prisms, m. 114–5°; in $CHCl_3$, $[\alpha]_D$ 118.8°. *d-Triazodihydrocarvone*, from the preceding compd.; liquid, $b_{0.4e}$ 94°; d^{20} 1.0487; $[\alpha]_D$ 88.49°; in $CHCl_3$, $[\alpha]_D$ 94.4°. *Semicarbazone*, m. 220° (decomp.). Reduction of the triazoketone by Al-Hg gives chiefly active dihydrocarvone (oxime, m. 88–9°) and a *base*, m. 110–2°. *Chloroplatinate*. *l-Limonene nitrosoazide*, m. 52–3°; in $CHCl_3$, $[\alpha]_D$ less than —1°. Yield, poor. *Phenylcarbamyl derivative*, needles, m. 114–5°; in $CHCl_3$, $[\alpha]_D$ —120.8°. *l-Triazodihydrocarvone*, $b_{0.4s}$ 93–4°; d^{20} 1.0472; $[\alpha]_D$ —92.47°; in $CHCl_3$, $[\alpha]_D$ —94.22°. Yield, about 60%. *Semicarbazone*, m. 220° (decomp.). Al-Hg reduces the triazo ketone to *l*-dihydrocarvone and a small quantity of a solid *base*. Equal quantities of *d*- and *l*-limonene nitrosoazides when cryst. together give (I). *dl*-Triazodihydrocarvonesemicarbazone was formed from *d*- and *l*-triazodihydrocarvones and semicarbazine. *Pinol nitrosoazide* (III), from pinol nitrosochloride and NaN_3; m. 160°. It is very stable. The



(III)

correspondence in structure between the above nitrosoazides and the nitrosocyanides follows from their chem. behavior. J. BISHOP TINGLE.

Preparation of the Betaine of Tryptophan and its Identity with the Alkaloid Hypaphorine. PIETER VAN ROMBURGH AND GEORGE BARGER. Org. Chem. Lab., Univ. Utrecht and Chem. Lab., Goldsmiths' College, New Cross, London. *J. Chem. Soc.*, **99**, 2068–71.—*Methyl α-trimethylamino-β-indolepropionate iodide*,

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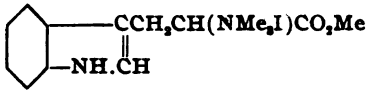
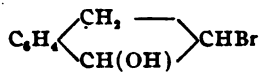


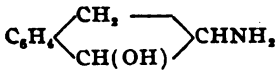
from tryptophan, MeI, NaOH and MeOH; plates, m. 197°. Yield, 80% of the tryptophan. It is also formed from hypaphorine, as above, and with dil. aq. NaOH is hydrolyzed to hypaphorine. This latter is readily hydrolyzed to indole and NMe_3.

J. BISHOP TINGLE.

Dihydroxydihydrindamine and its Resolution into Optically Active Components. WILLIAM J. POPE AND JOHN READ. Chem. Lab., Univ. Cambridge. *J. Chem. Soc.*, 99, 2071–80.—*dl*-Bromohydroxyhydrindene, formula (I) below, is best prepared from

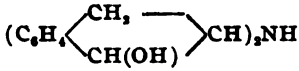


(I)

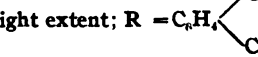


(II)

Br-H_2O and indene. Yield, 70%. Pseudohexagonal crystals of the monosymmetric system, $a : b : c = 3.2080 : 1 : 2.4615$; β 60° 0′. With aq. NH_3 (I) gives hydroxyhydrindamine (II) and dihydroxydihydrindamine (III); the latter m. 205°, not 186°.



(III)

d-Camphor-β-sulfonate, needles. *Chloroplatinate*, orange-yellow scales, m. 211°. The mother liquor from (III) (the *ddll*-base) contains a little *dl-base*; needles, m. 178°. *Chloroplatinate*, oil. The *d*- and *l*-isomers of (III) were separated by *d*,α-bromocamphor-π-sulfonic acid; needles, m. 223°. The following values were found in aq. HCl, for [α] for the resp. lines given, Hg green, —100.0, 99.8; Hg yellow, —86.4, 86.1; Na yellow, —83.3, 83.2; [M] —281.0, 281.0; —243.0, 242.0; —234.0, 234.0, resp. Mean rotatory dispersion for the basic ion in H_2O is Hg green/Na yellow, 1.200; Hg yellow/Na yellow, 1.037. *d*- and *l-Chloroplatinates*, orange needles, m. 185°; in H_2O, [α] 55.7, Hg green; 47.2, Hg yellow; 46.3, Na yellow; rotatory dispersions Hg green/Na yellow, 1.203; Hg yellow/Na yellow, 1.019; [M]/2 271.0, 230.0 and 225.0, resp. *l-Dihydroxydihydrindamine d,α-bromocamphor-π-sulfonate*, needles, m. 210-5°; in alc., [α], Hg green, 43.4; Hg yellow, 36.5; Na yellow 34.0; in H_2O, 9.6, 6.6 and 5.9, resp.; [M], 265,0, 223.0, 207.0, 59.0, 40.0 and 36.0, resp.; rotatory dispersions, in alc., Hg green/Na yellow, 1.276; Hg yellow/Na yellow, 1.074; in H_2O, 1.627 and 1.119, resp. *l-Dihydroxydihydrindamine l,α-bromocamphor-π-sulfonate*, needles, m. 230–2°; [α], in alc., Hg green, —83.1; Hg yellow, —69.3; Na yellow, —65.9; in H_2O, —102.8, —88.5 and —82.5, resp.; [M] —507.0, —423.0, —402.0, —628.0, —540.0 and —503.0, resp.; rotatory dispersions, in alc., Hg green/Hg yellow, 1.261; Hg yellow/Na yellow, 1.052; in H_2O, 1.246 and 1.073, resp. *dl*-Hydroxyhydrindamine (II), does not absorb CO_2 and H_2O, (Spilker). *Chloroplatinate*, orange needles, m. 232°. With *d*,α-bromocamphor-π-sulfonate (II) may be resolved into optical isomers. In the formation of (III) the chief reactions are *d*-RNH_2 + *d*-RBr ⟶ (*d* R)$_2$NH and *l*-RNH_2 + *l*-RBr ⟶ (*l*-R)$_2$NH, apparently the reactions *d*-RNH_2 + *l*-RBr ⟶ (*d*-R) (*l*-R)NH and *l*-RNH_2 + *d*-RBr ⟶ (*d*-R)(*l*-R)NH, proceed only to a slight extent; R =  .

J. BISHOP TINGLE.

Studies in Phototrophy and Thermotropy. II. Naphthylideneamines. ALFRED SENIER AND ROSALIND CLARKE. Univ. College, Galway. *J. Chem. Soc.*, 99, 2081–

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4; *Proc. Chem. Soc.*, **27**, 260; cf. *C. A.*, **3**, 2122; **4**, 1025.—The compds. described below were prepared from 2-hydroxy-α-naphthaldehyde and the resp. amines; not a single 1 is phototropic, but all are thermotropic in varying degree. At the "lower temp." all become paler and at the "higher temp." deeper in color; orange becomes yellow and yellow, orange, or, in the case of the aminophenol derivs., red. *2-Hydroxy-α-naphthylidene-o-chloroaniline*, $HOC_{10}H_6CH : NC_6H_4Cl$, yellow needles, m. 144.5° (cor.). *2-Hydroxy-α-naphthylidene-m-chloroaniline*, orange-yellow needles, m. 116–7° (cor.). *2-Hydroxy-α-naphthylidene-p-chloroaniline*, yellow needles, m. 158–9° (cor.). *2-Hydroxy-α-naphthylidene-o-bromoaniline*, yellow needles, m. 150° (cor.). *2-Hydroxy-α-naphthylidene-m-bromoaniline*, orange-yellow needles, m. 144° (cor.). *2-Hydroxy-α-naphthylidene-p-bromoaniline*, yellow leaflets, or pale yellow needles, m. 166.5° (cor.). *2-Hydroxy-α-naphthylidene-m-nitroaniline*, orange-red needles, m. 178.5–9.5° (cor.). *2-Hydroxy-α-naphthylidene-o-aminophenol*, brown crystals, m. 248–50° (cor.) (decomp.). *2-Hydroxy-α-naphthylidene-m-aminophenol*, yellow needles, m. 221° (cor.) (decomp.). *2-Hydroxy-α-naphthylidene-p-aminophenol*, yellow needles, m. 229.5° (cor.) (decomp.). *2-Hydroxy-α-naphthylidene-o-anisidine*, yellow crystals, m. 178.5° (cor.). *2-Hydroxy-α-naphthylidene-m-anisidine*, yellow needles, m. 107.5–8.5° (cor.). *2-Hydroxy-α-naphthylidene-p-anisidine*, yellow needles, m. 111–2° (cor.). *2-Hydroxy-α-naphthylidene-o-aminobenzoic acid*, orange-yellow crystals, m. 227.5° (cor.). *2-Hydroxy-α-naphthylidene-m-aminobenzoic acid*, yellow needles, m. 281.5° (cor.) (decomp.). *2-Hydroxy-α-naphthylidene-p-aminobenzoic acid*, yellow crystals, m. 298° (cor.) (decomp.). *2-Hydroxy-α-naphthylidene-o-4-xylidine*, yellow needles, m. 125.5° (cor.). *2-Hydroxy-α-naphthylidene-m-4-xylidine*, yellow needles, m. 157° (cor.). *2-Hydroxy-α-naphthylidene-p-xylidine*, yellow crystals, m. 108.5–9.5° (cor.). *2-Hydroxy-α-naphthylidene-ψ-cumidine*, yellow needles, m. 146–7° (cor.). J. Bishop Tingle.

Isomeric Acetaldehydephenylhydrazones. Ernyst G. Laws and Nevil V. Sidgwick. Daubeny Lab., Magdalen Col., Oxford. *J. Chem. Soc.*, **99**, 2085–93.—Lockemann and Liesche's statements (*Ann.*, **342**, 14 (1905)) are mostly confirmed. The f. p. curve proves definitly that the 2 forms of acetaldehydephenylhydrazone are isomorphous and form a continuous series of mixed crystals. They have the same d. and undergo no physical change—even in optical properties—when transformation occurs. Contrary to L. and L.'s statement, each isomeride and all intermediate mixts. undergo no change when oxidation and H_2O access are prevented. Solvents give an equil. mixt. from either form. The isomerism is probably stereochem. and the energy content of the 2 forms is very nearly identical. A similar, but less well defined isomerism is shown by acetaldehyde-*p*-tolyhydrazone, but not by acetaldehyde-*p*-bromo-, or *p*-nitrophenylhydrazones. J. Bishop Tingle.

Formation of Six- and Seven-membered Rings from Derivatives of 2,2'-Ditolyl. James Kenner and Emily G. Turner. Univ. Sheffield. *J. Chem. Soc.*, **99**, 2101–14.—*ω,ω'-Dibromo-2,2'-ditolyl*, prisms, m. 87.5. Yield, 66% of the ditolyl. With Na, in b. Et_2O, it gives dihydrophenanthrene. Yield, 26%. *2,2'-Ditolyl-ω,ω'-dicarboxylnitrile*, from the dibromo compd. and KCN; rectangular blocks, m. 77°. Yield, about 90%. *2,2'-Ditolyl-ω,ω'-dicarboxyamide*, from the nitrile; needles, m. 210–1°. KOH hydrolyzes it to *2,2'-ditolyl-ω,ω'-dicarboxylic acid*, prisms, m. 152°. *1-Imino-2-cyano-3,5-dibenzo-*$\Delta^{3,5}$*-cycloheptadiene*, formula (I) below, from the nitrile and EtONa; prismatic crystals, m. 189°. Yield, over 80%. *1-Imino-3,5-dibenzo-*$\Delta^{3,5}$*-cycloheptadiene-2-carboxylic acid*, needles, m. 180°. B. H_2SO_4 converts it into *3,5-dibenzo-*$\Delta^{3,5}$*-cycloheptadiene-1-one* (II); hexagonal crystals, m. 78–9°. Yield, 80%. *Oxime*, needles, m. 189°. *ω,ω,ω',ω',-Tetrabromo-2,2'-ditolyl*, m. 138°. Yield, nearly 100% of the ditolyl. With Na, in Et_2O, it gives phenanthrene. Yield, 24% of the bromo

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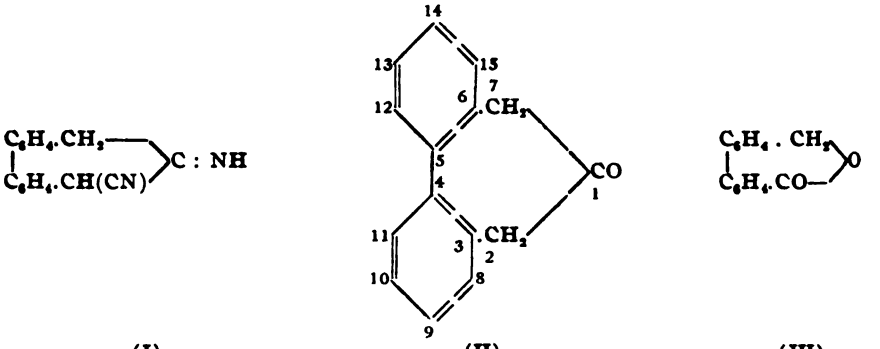
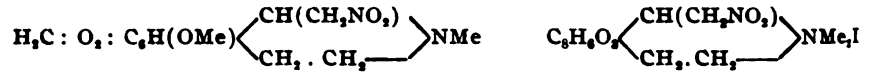
compd. Alc. and $C_2O_4K_2$ hydrolyze the tetrabromo compd. to *2,2'-dialdehydodiphenyl*, $OCHC_6H_4C_6H_4CHO$; leaflets, m. 62°. Yield, quant. *Phenylhydrazone*, light yellow



(I) (II) (III)

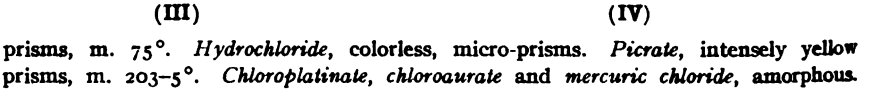
prisms, changing to bright red on exposure to light. Aq. KOH converts the dialdehyde into a lactone (III) and *ω-hydroxy-2-methyldiphenyl-2'-carboxylic acid*, $HOCH_2C_6H_4$-$C_6H_4CO_2H$; prismatic crystals, m. 146°. At 110° it is converted into the *lactone* (III); prisms, m. 132°. J. Bishop Tingle.

Synthetical Experiments in the Group of the Isoquinoline Alkaloids. II. The Constitution of the Condensation Products of Cotarnine and the Condensation of Cotarnine with Aliphatic and Aromatic Nitro Compounds. Edward Hope and Robert Robinson. Univ. Manchester. *J. Chem. Soc.*, **90**, 2114–37; cf. *C. A.*, **5**, 3560.—*Anhydrocotarninenitromethane*, formula (I) below, from cotarnine and $MeNO_2$;



(I) (II)

prisms, m. 129°. *Hydrochloride*, needles. *Picrate*, yellow needles, m. 136–7°. *Methylanhydrocotarninenitromethane methiodide*, $O_2NCH : CHC_6H_2O_2CH_2CH_2NMe_2I$, from (I) and MeI; yellow crystals, m. 229°. With KOH it gives Me_3N. *Anhydrocotarninenitromethane methiodide*, probably (II), formed with the preceding compd.; almost colorless needles with 1 H_2O, m. 199°. *Anhydrocotarninenitroethane picrate*, greenish yellow prisms, m. 114–6°. *Methiodide*, $C_{15}H_{21}O_6N_2I$, pale yellow plates, m. and darkens 216–8° (decomp.). *Anhydrocotarninenitroethane* is a gum. *Anhydrocotarnine-2-nitrotoluene* (III), from cotarnine, *o*-nitrotoluene and EtONa; pale yellow



(III) (IV)

prisms, m. 75°. *Hydrochloride*, colorless, micro-prisms. *Picrate*, intensely yellow prisms, m. 203–5°. *Chloroplatinate*, *chloroaurate* and *mercuric chloride*, amorphous. When (III) is reduced and the product diazotized and treated with β-naphthol, or "R salt," it gives intensely red *azo dyes*. *Anhydrocotarnine-4-nitrotoluene*, prepared like (III); leaf-shaped crystals, m. 121–2°. *Hydrochloride*, prisms. *Sulfate*. *Chloroplatinate*, yellow needles. *Picrate*, canary-yellow prisms, m. 188–90°. The *reduction product* of anhydrocotarnine-4-nitrotoluene gives red *azo dyes*. Me 3-nitro-4-methylbenzoate, needles, m. 51°. It condenses readily with cotarnine giving *methyl anhydrocotarnine-3-nitro-4-methylbenzoate*; almost colorless, prismatic crystals, m. 146°.

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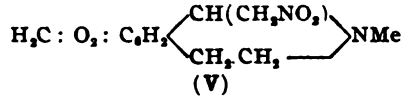
Picrate, canary-yellow prisms, m. 163–70°. *Acid. Picrate*, bright yellow prisms, m. 183–5°. *Anhydrocotarnine-2,6-dinitrotoluene*, bright yellow prisms, m. 112–4°. *Picrate*, canary-yellow prisms, m. 153–5°. *Methiodide*, pale yellow prisms, m. 210–2°. With AgCl, followed by NaOH, it gives *2',6'-dinitro-2-methoxy-3,4-methylenedioxy-6,β-dimethylaminoethylstilbene*, $(O_2N)_2C_6H_2CH : CHC_6H(OMe)(: O_2 : CH_2)CH_2$-$CH_2NMe_2$; orange-red plates, m. 93–5°, or yellow crystals; m. 75°. These latter contain solvent. *Hydrochloride. Picrate*, cryst. *Anhydrocotarnine-2,4-dinitrotoluene*, prepared like the isomer; yellow prisms, m. 145–6° (decomp.). *Methiodide*, orange prisms, m. 244–5° (decomp.). With AgCl and then NaOH it gives *2',4'-dinitro-2-methoxy-3,4-methylenedioxy-6,β-dimethylaminoethylstilbene*; reddish brown prisms, m. 155°. *Hydrochloride*, yellow plates. *Picrate*, yellow tablets, m. 185-7°. *Hydriodide*, yellow crystals changing, when warmed with a solvent, to red prisms, m. 245–8° (decomp.). *Methiodide*, $C_{21}H_{24}O_7N_2I$, orange-yellow prisms, m. 244–6°. *Methochloride*, crystals resembling PbI_2. With AgOH it gives *2',4'-dinitro-2-methoxy-3,4-methylenedioxy-6-vinylstilbene*, $(O_2N)_2C_6H_2CH : CHC_6H(OMe)(: O : CH_2)CH : CH_2$ which is also formed from cotarnine and 2,4-dinitrotoluene; brownish yellow prisms, becomes brilliant red 90°, m. 162–3°. The intermediate *ammonium hydroxide* is very stable; golden spangles, becomes red 120–30°, decomp, 164–6°. *Methyl anhydrocotarnine-2,4-dinitrophenylacetate*, $(O_2N)_2C_6H_2C(CO_2Me) : CHC_6H(OMe)(: O_2 : CH_2)CH_2CH_2NHMe$, from Me 2,4-dinitrophenylacetate and cotarnine; jet-black crystals with a green iridescence, m. 150–1° (decomp.). With MeI it gives a *compound*; pale yellow plates, m. 210-3° (decomp.). *Hydrocotarnine hydriodide*, colorless needles, m. 195–6°. *Hydrocotarnine methiodide*, prisms, m. 206–7°. *Anhydrocotarnine-2,4,6-trinitrotoluene*, intensely yellow prisms, m. 130° (decomp.). *Hydrochloride*, yellow needles. *Dianhydrodicotarnine-2,4,6-trinitro-m-xylene* (IV), pale yellow prisms, m. 153–4°, previously darkening (decomp.). *Chloroplatinate* and *chloroaurate*, amorphous. *Dianhydrocotarninetrinitromesitylene*, $(O_2N)_3C_6Me(CH_2C_{12}H_{14}O_3N)_2$, pale yellow, prismatic crystals, m. 183–5°. *Anhydrohydrastininenitromethane* (V), from hydrastinine and $MeNO_2$;



(V)

needles, m. 121–2°. *Chloroaurate*, amorphous. *Picrate*, orange-yellow needles, m. 173–4°. *Hydrochloride. Anhydrohydrastinine-2,4-dinitrotoluene*, pale yellow needles, m. 143–4° (decomp.). Yield, almost quant. *Hydrochloride*, pale yellow prisms. *Picrate*, pale yellow prisms, m. 172–3°. The above aromatic nitro cyclic condensation compds. are decomp. into their constituents by glacial AcOH. J. Bishop Tingle.

Nitration of the Nitrobenzoyl Derivatives (*o-*, *m-* and *p-*) **of *p*-Anisidine.** Frédéric Reverdin. Org. Chem. Lab., Univ. Geneva. *Ber.*, 44, 2362–9; cf. *C. A.*, 4, 2648; 5, 3411.—*o-Nitrobenzoyl-p-anisidine*, from *o*-nitrobenzoyl chloride and *p*-anisidine; pale yellow needles, m. 170°. *m-Nitrobenzoyl-p-anisidine*, yellowish green needles, m. 174.5°. *p-Nitrobenzoyl-p-anisidine*, greenish yellow needles, m. 197°. The nitration expts. described below were made as follows: (A) by adding the substance gradually to 10 pts. of HNO_3 (d. 1.52). (B) In a similar manner with HNO_3 (d. 1.4). (C) The substance is mixed with glacial AcOH (10 pts.) and HNO_3 (d. 1.52) added. (D) The same as (C), but with HNO_3 (d. 1.4). These methods are referred to by the resp. letters. Nitration was always commenced at the ordinary temp., the temp. to which the mixture was raised eventually is stated. Nitration of *o*-nitrobenzoylanisidine. (A) 70°: Dinitro compds. and *o-nitrobenzoyl-2,3,6-trinitro-p-anisidine*, needles, m. 255°. Yield, 25%. (B) 70°: A mixt. of *o-nitrobenzoyl-2,3-* and *2,5-dinitroanisidine* was formed. Yield, 60%. (C) 50°:

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Same products as in (B) but *o-nitrobenzoyl-2,3-dinitroanisidine*, $(O_2N)_2^{2,3}C_6H_2^{4}(OMe)^{1}NHCOC_6H_4^{1}NO_2^{2}$ was formed in much the larger quantity; lemon-yellow needles, m. 223°. Yield, 50% of pure substance. (D) 80°: The product is *o-nitrobenzoyl-2-nitro-p-anisidine*, orange needles, m. 172°. Yield, 80%. NITRATION OF *m*-NITROBENZOYLANISIDINE. (A) 70°: The chief product is *m*-nitrobenzoyl-2,3,5-anisidine (OMe = 4). (B) 60–70°: A mixt. was obtained in which were present *m-nitrobenzoyl-2-nitroanisidine* and *m-nitrobenzoyl-2,3-dinitroanisidine*, see below. (C) 50–60°: The chief product, *m-nitrobenzoyl-2,3-dinitro-p-anisidine*, pale yellow needles, m. 218°. Yield, 70%. By the action of HNO_3 (d. 1.52) the above 2,3-dinitro compd. gives a *trinitroanisidine derivative*, m. 247°. (D) 80°: The product consists of *m*-nitrobenzoyl-2,3-dinitroanisidine and *m-nitrobenzoyl-2-nitro-p-anisidine*; orange crystals, m. 165–6°. When nitrated it gives the above 2,3-dinitroanisidine deriv. NITRATION OF *p*-NITROBENZOYLANISIDINE. (A) 45° and 50°: The chief product is *p-nitrobenzoyl-2,3,5-trinitroanisidine*, needles, m. 253°. Yield, 40%. (B) 50°: The product consists of *p-nitrobenzoyl-2-nitroanisidine*, orange needles, m. 204°. (C) 70°: The product consists of *p-nitrobenzoyl-2,3-dinitro-p-anisidine*, which is best prepared from the preceding 2-nitro compd. and HNO_3 (d. 1.52); lemon-yellow crystals, m 208°. Yield, 70%. (D) 100°: Chief product, *p*-nitrobenzoyl-2-nitroanisidine (see above) together with a mixture of higher nitrated products. These results show that the nitration of the nitrobenzoylanisidines gives products which, as regards the position of the NO_2 in the nucleus, are similar to the compds. from 2-nitro-, 2,3-dinitro- and 2,3,5-trinitro-4-methoxyaniline. The effect of the NO_2 in the Bz nucleus (comparison of benzoylanisidine with the nitrobenzoylanisidines) is quite marked; its presence greatly facilitates the nitration. J. BISHOP TINGLE.

Cyclo-octane Series. V. Cyclo-octatetraene. RICHARD WILLSTÄTTER AND ERNST WASER. Chem. Lab., Fed. Techn. Hochsch., Zurich. *Ber.*, **44**, 3423–45; cf. *C. A.*, **4**, 2469 and *Ber.*, **38**, 1984 (1905).—Methylgranatenine was prepared from methylgranatoline, glacial AcOH and conc. H_2SO_4, at 180°; cryst., m. 17.2–17.4°; b_9 62.0–62.2°; b_{732} 186–6.5°; d_4^{20} 0.961. In H_2SO_4 it decolorizes "permanganate" but not Br. *Picrate*, quadratic rods, decomp. 286°. *Methiodide*, cubes. *Chloroplatinate*, long prisms from H_2O, m. 221° (decomp.). The methiodide was converted into a quaternary NH_4 base which, when distilled (10 mm.), gives *α-dimethylgranatenine*, $C_8H_{11}NMe_2$; colorless, mobil, highly refractive oil, b_8 71–1.5°; d_4^0 0.925; d_4^{20} 0.910. Unlike the *β*-compd. it gives no granatal when b. with HCl. *Methiodide*, needles, m. 172–3° (decomp.). It is distinguished from the *β*-compd. by its solubility in acetone and $CHCl_3$. *Chloroplatinate*, rhombohedral plates, m. 168–9°, decomp. at a higher temp. and dissolves in 9 pts. of b. H_2O. *β*-Dimethylgranatenine has been analyzed; b_{720} 218–20°; d_4^0 0.973; d_4^{20} 0.959. Δ^2-Cyclo-octenone (granatal), $C_8H_{12}O$, is reduced easily by H and Pt black. The quaternary base from *α*-dimethylgranatenine gives Me_3N and *cyclo-octatriene*, C_8H_{10}; colorless, mobil oil with a sweet odor; its vapor produces headache; b_8 31.2 –1.8°; b_{11} 33.5°; b.147.2–8.2° (cor.); d_4^0 0.925; d_4^{20} 0.909; n_C^{20} 1.52281; n_D^{20} 1.52810; n_F^{20} 1.54131; n_G^{20} 1.55322; M_α 35.65; M_D 35.95; $M_{\beta-\alpha}$ 1.05; $M_{\gamma-\alpha}$ 1.72; EM 0.37, 0.41, 0.21 and 0.38, resp.; $E\Sigma$ 0.35, 0.39, 20% and 22%, resp. Yield, 72%. The compd. gives an amorphous, brown solid on exposure to air; with Pt black and H it is reduced to pure cyclo-octane. *Dibromo derivative*, $C_8H_{10}Br_2$; water-clear oil, b_9 129.5–30°; b_{14} 136–7.5°; d_4^0 1.762. Its vapor attacks the mucous membrane. When distilled with Me_2NPh it gives *dimethylaminocyclo-octatriene*, $C_8H_9NMe_2$; colorless, mobil oil, b_{10} 81–91°; d_4^{20} 0.946; d_4^{20} 0.934. It absorbs O from air and is not changed by b. with dil. mineral acids. *Methiodide*, feathery aggregates of prisms from H_2O, m. 224–5° (decomp.). It is very sparingly sol. in $CHCl_3$. *Chloroplatinate*,

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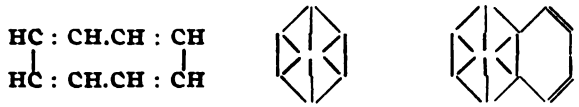
acute-angled, quadratic prisms from H_2O, m. 200° (decomp.). *Tetramethyldiaminocyclo-octadiene*, $C_8H_{10}(NMe_2)_2$, is formed together with the preceding base, but is best prepared from the dibromide, Me_2NPh and C_6H_6 at the ordinary temp.; yellow oil with a narcotic odor; it rapidly darkens in air; b_{14} 126–7°; d_4^0 0.944; d_4^{20} 0.935. *Chloroplatinate*, prismatic aggregates from H_2O, blackens 210°, decomp. 220°. *Methobromide*, from the base and MeBr and also from Me_2N and cyclo-octatriene bromide; lustrous, quadratic, hygroscopic prisms from MeOH, or alc., m. 195–6° (decomp.). *Methiodide*, large, broad crystals from alc., m. 170-1° (decomp.). Its *chloroplatinate*, $C_8H_{10}(NMe_2)_2PtCl_6$, short, monoclinic prisms, or plates from H_2O, darkens 225°. *Tetramethyldiaminocyclo-octane*, $C_8H_{14}(NMe_2)_2$, is formed from the above diamine; pale yellow oil with a slight odor, b_{718} 259-61°; d_4^0 0.926; d_4^{20} 0.913. A hydrocarbon, C_8H_8, was obtained from cyclo-octatriene dibromide and quinoline, at 150-70°; b_{10} 31.6–2.8°; b_{737} 142.8-3.8°; d_4^0 0.927; d_4^{20} 0.912; n_C^{20} 1.53460; n_D^{20} 1.54107; n_F^{20} 1.55764; n_G^{20} 1.57243. The compd. adds Br instantly, is unstable towards "permanganate" and contains bridge linkages, because, with Pt and H, it gives a mixture of bicyclo-octane, C_8H_{14}, and tricyclo-octane, C_8H_{12}. Yield, of the compd. C_8H_8, 20%. Tetramethyldiaminocyclo-octadiene methiodide when treated with Ag_2O and the product distilled in a vacuum gives *cyclo-octatetraene*, formula (I) below; yellow liquid with an intensely



(I) (II) (III)

sweet odor; its vapor produces headache; b_{17} 42.2–42.4°; d_4^0 0.943; d_4^{20} 0.925°; n_D^{20} 1.5389; mol. ref. 35.20. Brown flocks are produced on exposure to air; with Pt black and H it gives cyclo-octane. Cyclo-octatetraene differs from C_6H_6 as follows: (1) It quickly adds 4 H ats. in presence of Pt; (2) it reduces "permanganate" very readily and instantly adds Br; (3) HNO_3 + H_2SO_4 produces only a resin and not a nitro compd.; (4) it isomerizes rather quickly into compds. with bridged rings. These observations lead to the conclusion that C_6H_6 cannot have Kekulé's formula, but must be represented by the Baeyer-Armstrong centric formula (II). Naphthalene is best represented by (III). J. Bishop Tingle.

Nitrohydroxyarylarsinic Acids. L. Benda and A. Bertheim. Lab. L. Cassella & Co., Mainkur and Chem. Dept., Georg-Speyer Inst., Frankfort a/M. *Ber.*, **44**, 3445–8. —*4-Hydroxy-3-nitrophenylarsinic acid*, $HOC_6H_3(NO_2)AsO_3H_2$, is prepared from Na *p*-hydroxyphenylarsinate, conc. H_2SO_4 and HNO_3 (d 1.4), at 0°; almost white spikelets, or amber-colored prisms from H_2O, decomp. and becomes incandescent when heated. *Monosodium salt*, pale yellow, with an acid reaction. *Disodium salt*, orange-colored, with a neutral reaction. *Trisodium salt*, exists in 2 modifications, orange-colored and red, the former is produced in presence of alc. and excess of NaOH; the red form becomes orange when heated. These 2 salts are alk. to litmus, neutral to phenolph. *p-Toluenesulfonate*, silvery lustrous plates from MeOH + H_2O, m. 171°, previously softening. In aq. $NaHCO_3$ it is colorless. Yield, about 40%. *4-Hydroxy-3,5-dinitrophenylarsinic acid*, $HOC_6H_2(NO_2)_2AsO_3H_2$, prepared like the mononitro compd., but with HNO_3 (1.52) at 15–20°; small, yellow plates from H_2O, becomes incandescent when heated. Yield, 72.65%. In alkali it is orange-yellow, changing to dark red with Na hyposulfite. This test serves for its detection in mixts. *3-Nitro-4-hydroxy-5-methylphenylarsinic* acid, $HOC_6H_2Me(NO_2)AsO_3H_2$, is prepared like the nitrophenyl compd.; pale yellow plates, or needles from AcOH (50%). Yield, about 90%. It resembles the nitrophenyl acid in general properties (cf. following abstr.).

J. Bishop Tingle.

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3-Nitro-4-hydroxyphenylarsinic Acid. L. BENDA. *Ber.*, 44, 3449–51.—The compd. $HOC_6H_4N : NC_6H_4NO_2$ is formed from *p*-nitrobenzenediazonium hydroxide and *p*-hydroxyphenylarsinic acid, in aq. Na_2CO_3, and also from PhOH and *p*-nitrobenzenediazonium hydroxide. 3-Nitro-4-hydroxyphenylarsinic acid is best prepared by heating 3-nitroarsanilic acid (50 g.) with aq. KOH (150 cc.) (36° Bé.) at 80°, until the product ceases to react with "R salt." The liquid is poured on ice (300 g.) and HCl (d. 1.185) added (about 100 cc.) until it is neutral to curcuma; it is filtered rapidly and more HCl (100 cc.) added. The nitro acid is deposited after 24 hrs. It is identical with that described in the preceding abstr. J. BISHOP TINGLE.

***N*-Quinhydrones.** M. M. RICHTER. Private Lab., Karlsruhe i/B. *Ber.*, 44, 3466–9.—*Periodo-N-benzoquinhydrone dihydriodide*, $C_{12}H_{14}N_2I_2.2HI$, is prepared from *p*-phenylenediamine and I, in C_6H_6; almost black, unstable powder. *Periodo-N-benzidinquinhydrone dihydriodide*, $C_{24}H_{22}N_4I_4.2HI$, from benzidine; grayish black, unstable powder. R. assumes that the above compds. and their analogs are R′ : NH_2-NHR (R′ = a quinoidal nucleus). 2,3-Diaminophenazine is formed from I and *o*-phenylenediamine. J. BISHOP TINGLE.

Fluorescence in the *p*-Benzoquinone Series. M. M. RICHTER. Private Lab., Karlsruhe i./B. *Ber.*, 44, 3469–73.—*3,6-Dicyano-2,5-dihydroxy-1,4-benzoquinone (cyananilic acid)*, $(NC)_2C_6(OH)_2(: O)_2$, is prepared from KCN, chloroanil and dil. MeOH; brown crystals with 2 H_2O from alc., chars without m. It is a strong acid, is hydrolyzed with difficulty and exhibits the following fluorescence colors in the solvents mentioned: H_2O, yellowish green; H_2O_2, orange; alc., MeOH, acetone, or $CHCl_3$, green; NH_3, brick-red; aq. KOH, NaOH, $Ca(OH)_2$ or $Ba(OH)_2$, red; conc. H_2SO_4, HCl or HNO_3, green. The quinone is also formed by b. 2,5-dihydroxy-3,6-dichloro-1,4-quinone with MeOH and KCN (yield poor) and from trichloroquinone, in a similar manner. *Ammonium salt*, dark red, amorphous powder. *Potassium salt*. *Silver salt*, brown. The above quinone does not accord with Kauffmann's views regarding the cause of fluorescence and it is therefore suggested that it may have the peroxide formula. J. BISHOP TINGLE.

Formation of Carbamide by Heating Ammonium Carbamate. FR. FICHTER AND BERNHARD BECKER. Inorg. Dept., Chem. Inst., Basel. *Ber.*, 44, 3473–80.—NH_4 carbamate is best prepared from NH_3 and CO_2 which are mixed in a wide tube containing a H_2O-cooled condenser. The presence of traces of alc. greatly reduces the yield of carbamide; at 130°, after 18 hrs. the yield of $CO(NH_2)_2$ was 27.06% and 9.50%, from dry carbamate and from that containing a trace of alc., resp., after 48 hrs. the yields were 27.2 and 11.34%, resp. The following yields of $CO(NH_2)_2$ were obtained from dry salt, after 24 hrs., at the temp. mentioned: 115°, 0.65; 120°, 5.20; 130°, 28.18; 135°, 30.07; 140°, 28.06; 150°, 24.28; after 48 hrs., 120°, 8.75; 130°, 30.06; 135°, 31.20; 140°, 27.96% of decomp. salt. At 135°, the influence of pressure is shown as follows, the roman numbers giving the salt in g. in a tube of 37 cc. capacity, italics the yield % salt decomp., and in parentheses the duration of heating in hrs.: I. 2, *trace* (24); 2, *13.6* (24); 3, *28.0* (24); 4, 31.2 (48); 8, *36.6* (48); 16, *36.7* (48); 16, *40.0* (72); 24, *40.64* (96). These results, together with measurements of the pressure developed in the tube, lead to the conclusion that any mixture of NH_3, CO_2, H_2O, or of $CO(NH_2)_2$ and H_2O, will eventually attain the same equilibrium at 135°, irrespective of the NH_4 salt employed, the equilibrium being dependent only on the ratio H_2O: NH_4 carbamate, in the original mixture. At 115°, H_2O + $CO(NH_2)_2$ give, after a short time, NH_4OCN, but this could not be obtained from NH_4 carbamate (cf. following abstr.). J. BISHOP TINGLE.

Formation of Symmetrical Dialkylcarbamides by Heating the Corresponding Carbamates. FR. FICHTER AND BERNHARD BECKER. *Ber.*, 44, 3481–5; cf. preceding

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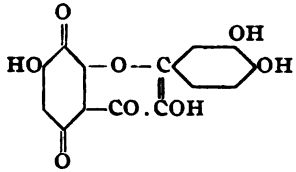
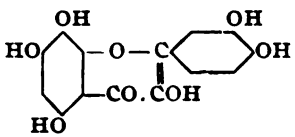
abstr.—The numbers given below represent the yield of the resp. carbamide in % of the decomp. carbamate, at the temp. stated; the time in hrs. is given in parentheses. Methylammonium methylcarbamate gives sym. dimethylcarbamide: 120°, —(20); 130°, 10.8 (20); 140°, 15.6 (20); 150°, 31.2 (20); 150°, 57.6 (40); 160°, 54.0 (20); 160°, 65.0 (40); 170°, 68.4 (20); 180°, 66.0 (20). *Ethylammonium ethylcarbamate*, $EtNHCO_2NH_2Et$, white and cryst., m. 118° (closed tube): 120°, 8.09 (20); 130°, 16.17 (20); 130°, 24.26 (40); 140°, 48.54 (40); 150°, 51.98 (20); 150°, 58.91 (40); 160°, 45.63 (20); 160°, 46.78 (40); 170°, 32.35 (20). After 40 hrs., at 150° sym. diethylcarbamide and H_2O, in equimol. proportion, gave 60.18% of unchanged carbamide. Benzylammonium benzylcarbamate gave dibenzylcarbamide: 150°, 39.8 (20); 160°, 47.3 (20); 170°, 52.7 (20); 180°, 55.9 (20); 180°, 58.0 (40). *Benzhydrylammonium benzhydrylcarbamate*, $Ph_2CHNHCO_2NH_2CHPh_2$, from benzhydrylamine and dry CO_2; white and voluminous, m. 165° (decomp.). When heated it gives *tribenzhydrylamine*, $(Ph_2CH)_3N$; bundles of slender needles from alc. + H_2O, m. 144°. *Picrate*. *Diethylammonium diethylcarbamate*, $Et_2NCO_2NH_2Et_2$, white and cryst., m. room temp. At 130–250°, it gives an odor of tetraethylcarbamide. Liquid Et_2NH, or Et_2NH, in moist Et_2O and CO_2 form *diethylammonium hydrogen carbonate*, $Et_2NH_2HCO_3$; white and cryst., decomp. suddenly 70°. Hydrazine hydrazinocarbonate, at 140°, during 20 hrs., gives carbohydrazide. Yield, 97%. *Ammonium hydrazinocarbonate* is formed from NH_3 and hydrazine hydrazinocarbonate, in alc.; white crusts, unstable in air, evolves NH_3 50–60°. When heated it gives semicarbazine: 110°, 36.6 (20); 120°, 51.2 (20); 120°, 51.4 (40); 130°, 43.4 (20); 145°, 21.7 (20). J. Bishop Tingle.

Anhydration Product of Mandelic Acid. Karl Stutz. Inorg. Dept., Chem. Inst., Basel. *Ber.*, **44**, 3485–7.—A vitreous *compound*, possibly $C_{32}H_{26}O_6$, is formed from mandelic acid (100 pts.) and pure H_2SO_4 (5 pts.), at 93°, during 8 hrs.; HCl (10%) may also be used and the temp., time and proportion of acid may be varied. The product is sol. in Et_2O. Warm, aq. NH_3 converts it (ordinary pressure) into mandelamide, the yield of which is greater than would be expected from the above formula. This indicates that the amorphous material is either a mixt. of anhydrides, or that it is the lactide, $C_8H_6O_3$, imperfectly dried. J. Bishop Tingle.

Anthocyanin. I. Anthocyanin-like Oxidation Product of Quercetin. M. Nierenstein and Muriel Wheldale. Biochem. Lab., Univ. Bristol. *Ber.*, **44**, 3487–91.—Quercetin, glacial AcOH and CrO_3 give *quercetone* formula (I) below; small, lustrous,



(I)



(II)

deep red needles from quinoline and $PhNO_2$, not m. below 360°. Yield, 81%. In alkali the color is blue, in conc. H_2SO_4 red. *Tetrabenzoyl derivative*, small, sharp needles from alc., m. 281–3° (decomp.). When fused with KOH (I) gives pyrocatechinic acid. B. with Ac_2O and Zn dust reduces (I) to *1,3,4,4',5'-pentahydroxyflavonol* (II); small, yellow microscopic needles from H_2O, evolves H_2O 160°, m. 352–5°. With alkali its color is yellow, changing to intense green by prolonged b.; with alc. and $FeCl_3$, brownish green. Its alc. soln. produces the following colors on cotton, mordanted as indicated: Cr, reddish brown; Al, orange; Sn, deep orange; Fe, greenish black. *1,3,4,4',5'-Pentamethoxyflavonol* from (II), Me_2SO_4 and

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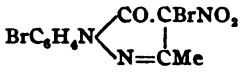
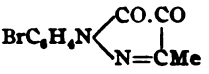
KOH; small, colorless needles from alc., softens 136–8°, m. 147–9°. At 170°, alc. KOH converts it into veratrumic acid. J. BISHOP TINGLE.

Conversion of the Nitro into the Keto Group. WILHELM WISLICENUS AND HERMANN GÖZ. Chem. Lab., Univ. Tübingen. *Ber.*, **44**, 3491–6; cf. *C. A.*, **4**, 2932.—*Potassuim 1-phenyl-3-methyl-4-isonitro-5-pyrazolone*, $C_{10}H_9O_3N_3K.H_2O$, from the nitropyrazolone and KOEt, in alc.; intensely yellow, silky lustrous needles from acetone, or aq. alc., becomes incandescent and explodes when heated. The anhydrous salt m. 250–5°. With Br it gives *1,p-bromophenyl-3-methyl-4-bromo-4-nitro-5-pyrazolone* formula (I) below; small, dark yellow prisms from petroleum ether, m. about 85°

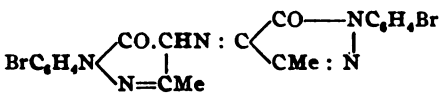


(I)

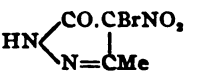


(II)

(gas evolution). When heated alone or with a solvent it gives *1,p-bromophenyl-3-methyl-4-keto-5-pyrazolone* (II); small, flat, highly lustrous prisms from ligroin, yellowish red in transmitted light, bluish red in reflected light, m. 171–2°, previously softening. In presence of b. H_2O, or alc., or with $NaHSO_3$ soln. it forms *additive compounds*: colorless needles. Aq. NaOH or Na_2CO_3 hydrolyzes (II) to *1,2-diketobutyric acid 2-p-bromophenylhydrazone*, $BrC_6H_4NHN : CMeCOCO_2H$; canary-yellow, microscopic prisms from alc. + H_2O, m. about 153–4°. With Ac_2O it regenerates (II). *Phenylosazone*, golden yellow, m. 211°. *Silver salt*, yellow and rather unstable. *Methyl ester*, from the Ag salt; brownish yellow, microscopic prisms from MeOH, m. about 165–70°. Prolonged warming of (II) with glacial AcOH converts it into *p,p-dibromorubazonic acid* (III); scarlet needles from xylene, or $PhNO_2$, m. 305–8°. Yield, about 50% of



(III)

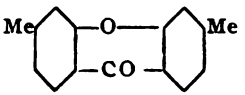


(IV)

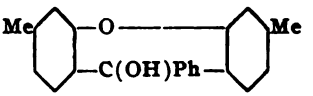
(II). With alc. KOH, or conc. NH_3 it gives a deep violet-red color. In H_2O, at 0°, Br and 3-methyl-4-nitro-5-pyrazolone give *3-methyl-4-bromo-4-nitro-5-pyrazolone* (IV); small, pale yellow prisms from C_6H_6 + petroleum ether, m. 84–5° (decomp.). In hot xylene it evolves NO + Br. J. BISHOP TINGLE.

Synthesis of Butein. A. GÖSCHER AND J. TAMBOR. Lab. Univ. Bern. *Ber.*, **44**, 3502–5.—Butein (2,4,4′,5′-tetrahydroxychalkone), which was isolated by A. G. Perkin and Hummel from the flowers of *Butea frondosa*, is synthesized from pyrocatechinic aldehyde, resacetophenone and aq. KOH; m. 210°. Tetraacetyl deriv., $(AcO)_2C_6H_3COCH : CHC_6H_3(OAc)_2$. *4′,5′-Methylene ether*, $(HO)_2C_6H_3COCH : CHC_6H_3 : O_2CH_2$, from resacetophenone, piperonaldehyde and aq. KOH; slender, yellow needles from alc. m., 185°. In aq. NaOH the color is dark yellow, in conc. H_2SO_4 dark orange-red. With KOH and Me_2SO_4 it gives *2,4-dimethoxy-4′, 5′-methylenedioxychalkone*; slender, pale yellow needles from alc., m. 168°. In conc. H_2SO_4 the color is dark orange. J. BISHOP TINGLE.

Carboxonium Compounds. F. KEHRMANN AND JOSEPH KNOP. Org. Lab., Univ. Lausanne. *Ber.*, **44**, 3505–13.—3,6-Dimethylxanthone, formula (I) below, was prepared from *m*-cresotic acid and Ac_2O; m. 172° (cor.), not 166°. Yield, 7–7.5% of the



(I)



(II)

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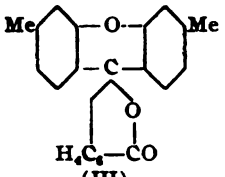
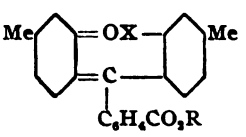
acid. With PhMgBr it gives 9-phenyl-3,6-dimethylxanthydrol (II); white crystals from acid + NH_3, m. 152° (cor.). In aq. mineral acids the color is yellow with a green fluorescence, the solns. have a bitter taste. *Bromide*, thick, orange-red prisms containing *dibromide*. *Iodide*, $C_{21}H_{17}OI$, blackish green, lustrous plates. 3,6-Dimethylfluoran (III) is best prepared from phthalic anhydride, *m*-cresol and $ZnCl_2$, at 140–50°.



(III)



(VI)

Yield, good. *Methyl 9-phenylxanthonium-o-carboxylate chloride* (IV; R = Me; X = Cl); slender, long, orange-yellow needles with 3 H_2O, after drying, with 2 H_2O. Its solns. have a green fluorescence. *Bromide*, orange-yellow crystals. *Iodide*, dark green needles. *Chloroplatinate*, heavy, cryst. powder. *Ethyl 3,6-dimethyl-9-phenylxanthonium-o-carboxylate chloride* (IV; R = Et; X = Cl); readily sol. *Bromide*. *Iodide*, dark green ppt. *9-Phenyl-2,7-dimethylxanthydrol ferric chloride*, $C_{21}H_{17}OCl.FeCl_3$, is prepared from 2,7-dimethyl-9-phenylxanthene and $FeCl_3$; thick, orange-red, lustrous prisms. With H_2O it gives *9-phenyl-2,7-dimethylxanthydrol* (V); white and flocculent. In conc. H_2SO_4 the color is intensely orange-red, with a strong greenish yellow fluorescence. The formulation of the above salts as oxonium compds. is contrary to the conclusion of Gomberg and Cone, according to which they should be regarded as carbonium derivs. (cf. *C. A.*, **4**, 1172). J. Bishop Tingle.

Spectrochemistry of Enols and of Enolic Derivatives. K. Auwers. Chem. Inst., Greifswald. *Ber.*, **44**, 3514–24.—The following physical consts. have been detd.: β-Methoxystyrene, PhCH : CHOMe, b_{13} 99°; $d_4^{23.3}$ 0.9894; $d_4^{24.3}$ 0.9886; d_4^{20} 0.992; n_α 1.55467; n_β 1.56197; n_β 1.58139; n_γ 1.59962 at 24.3°; n_D^{20} 1.5639; M_α 43.52; M_D 43.99; M_β-M_α 1.71; M_γ-M_α 2.86; EM 2.50, 2.65, 0.69 and 1.24, resp. β-Ethoxystyrene, PhCH : CHOEt, b_{14} 105°; $d_4^{21.4}$ 0.9714; $d_4^{21.2}$ 0.9716; d_4^{20} 0.973; n_α 1.54346; n_D 1.55023; n_β 1.56838; n_γ 1.58530 at 21.2°; n_D^{20} 1.5508; M_α 48.08; M_D 48.57; M_β-M_α 1.81; M_γ-M_α 3.03; EM 2.46, 2.63, 0.72 and 1.30, resp. α-Methoxystyrene, MeOCPh : CH_2, b_{18} 90.5°; b. 197°; $d_4^{25.1}$ 0.9935; $d_4^{25.0}$ 0.9936; d_4^{20} 0.998; n_α 1.53402; n_D 1.53997; n_β 1.55521; n_γ 1.56918 at 25.0°; n_D^{20} 1.5422; M_α 41.95; M_D 42.34; M_β-M_α 1.38; M_γ-M_α 2.28; EM 0.93, 1.00, 0.36 and 0.66, resp. α-Ethoxystyrene, EtOCPh : CH_2, b_{18} 99.6; $d_4^{23.0}$ 0.9675; $d_4^{23.2}$ 0.9673; d_4^{20} 0.970; n_α 1.52233; n_D 1.52775; n_β 1.54198; n_γ 1.55480, at 23.2°; n_D^{20} 1.5292; M_α 46.72; M_D 47.13; M_β-M_α 1.46; M_γ-M_α 2.41; EM 1.10, 1.18, 0.37 and 0.68, resp. Et β-ethoxyacrylate, EtOCH : $CHCO_2Et$, b_{11} 83.5–4.0°; $d_4^{17.6}$ 0.9957; $d_4^{18.1}$ 0.9953; d_4^{20} 0.994; n_α 1.44442; n_D 1.44802; n_β 1.45706; n_γ 1.46504, at 18.1°; n_D^{20} 1.4472; M_α 38.49; M_D 38.76; M_β-M_α 0.94; M_γ-M_α 1.54. Another specimen, b_{10} 78.5–9.0°; $d_4^{17.8}$ 0.9956; $d_4^{16.7}$ 0.9965; d_4^{20} 0.994; n_α 1.44497; n_D 1.44852; n_β 1.45765; n_γ 1.46574 at 16.7°; n_D^{20} 1.4470; M_α 38.48; M_D 38.75; M_β-M_α 0.95; M_γ-M_α 1.55; EM (mean) 1.34, 1.41, 0.28, 0.49, resp. Et β-ethoxy-α-methylacrylate, EtOCH : $CMeCO_2Et$, b. 195-6°; $d_4^{19.4}$ 0.9806; $d_4^{21.6}$ 0.9788; d_4^{20} 0.980; n_α 1.44649; n_D 1.45009; n_β 1.45931; n_γ 1.46760, at 21.6°; n_D^{20} 1.4508; M_α 43.10; M_D 43.42; M_β-M_α 1.08; M_γ-M_α 1.70; EM 1.35, 1.45, 0.34 and 0.53, resp. Me α,α-dimethoxypropionate, $(MeO)_2CMeCO_2Me$, $d_4^{19.2}$ 1.0675; $d_4^{19.35}$ 1.0674; d_4^{20} 1.067; n_α 1.40915; n_D 1.41127; n_β 1.41611; n_γ 1.42017, at 19.35°; n_D^{20} 1.4110; M_α 34.31; M_D 34.17; M_β-M_α 0.52; M_γ-M_α 0.82. Another specimen, b_{16} 66.0–66.5°; $d_4^{17.6}$ 1.0678; d_4^{20} 1.066; n_α 1.41035; n_D 1.41221; n_β 1.41721; n_γ 1.42130, at 17.6°; n_D^{20} 1.4111; M_α 34.39; M_D 34.53; M_β-M_α 0.50; M_γ-M_α 0.80; EM (mean) —0.35,

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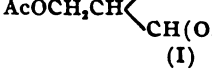
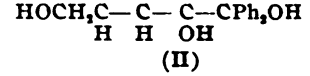
—0.35, —0.01 and —0.01, resp.; $E\Sigma$ (mean) —0.24, —0.24, —1% and —1%, resp. Me α-methoxyacrylate, CH_2:C(OMe)CO_2Me, b_{13} 53-4°; $d_4^{19'}$ 1.0701; $d_4^{18.95}$ 1.0702; $_4^{20}$ 1.069; n_α 1.42911; n_D 1.43207; n_β 1.43960; n_γ 1.44614, at 18.95°; n_D^{20} 1.4316; M_α 27.97; M_D 28.14; M_β-M_α 0.60; M_γ-M_α 0.97. Another specimen, b_{15} 55–6°; $d_4^{20.7}$ 1.0674; $d_4^{20.35}$ 1.0677; d_4^{20} 1.068; n_α 1.42886; n_D 1.43177; n_β 1.43935; n_γ 1.44585, at 20.35°; n_D^{20} 1.4316; M_α 28.03; M_D 28.19; M_β-M_α 0.59; M_γ-M_α 0.96; EM (mean) 0.04, 0.05, 0.07 and 0.14, resp. Et α,α-diethoxypropionate, $(EtO)_2CMeCO_2Et$, $d_4^{17.6}$ 0.9795; $d_4^{18.2}$ 0.9790; d_4^{20} 0.978; n_α 1.41255; n_D 1.41449; n_β 1.41949; n_β 1.42358, at 18.2°; n_D^{20} 1.4104; M_α 48.37; M_D 48.57; M_β-M_α 0.72; M_γ-M_α 1.14. Another specimen, b_{14} 81.5–2.5°; $d_4^{18.2}$ 0.9783; $d_4^{17.1}$ 0.9792; d_4^{20} 0.977; n_α 1.41314; n_D 1.41508; n_β 1.42001; n_γ 1.42419, at 17.1°; n_D^{20} 1.4101; M_α 48.42; M_D 48.62; M_β-M_α 0.71; M_γ-M_α 1.14; EM (mean) —0.09, —0.10, —0.01 and 0.02, resp.; $E\Sigma$ (mean) —0.05, —0.05, —1% and —2%, resp. Et α-ethoxyacrylate, CH_2 : C(OEt)CO_2Et, b_{760} 178–80°; $d_4^{18.2}$ 0.9937; $d_4^{17.8}$ 0.9940; d_4^{20} 0.992; n_α 1.42941; n_D 1.43216; n_β 1.43925; n_γ 1.44526, at 17.8°; n_D^{20} 1.4312; M_α 37.10; M_D 37.61; M_β-M_α 0.75; M_γ-M_α 1.20. Another specimen, b_{15} 72.5–4.5°; $d_4^{17.2}$ 0.9956; d_4^{20} 0.993; n_α 1.42941; n_D 1.43241; n_β 1.43925; n_γ 1.44536, at 17.2°; n_D^{20} 1.4312; M_α 37.35; M_D 37.57; M_β-M_α 0.74; M_γ-M_α 1.20; EM (mean) 0.23, 0.24, 0.08 and 0.14, resp. The above results show that the exaltation due to a C-C conjugated linkage is increased considerably by the presence of substituents containing O if they are linked to an end (side) C at., whereas their attachment to a middle C at. produces only a slight and variable effect on the exaltation. J. Bishop Tingle.

Spectrochemical Behavior and Constitution of Acetoacetic Ester. K. Auwers. Chem. Inst., Greifswald. *Ber.*, **44**, 3525–42.—A criticism of Hantzsch's results and conclusions (*C. A.*, **5**, 504). Homogeneous acetoacetic ester has M_α 31.81; M_D 32.02; M_γ-M_α 0.87; EM 0.38, 0.43 and 0.07, resp.; $E\Sigma$ 0.29, 0.33 and 9%, resp. Et β-ethoxycrotonate, m. 31°; $d_4^{42.8}$ 0.9615; $d_4^{49.1}$ 0.9565; n_α 1.43787; n_D 1.44100; n_β 1.44989; n_γ 1.45815 at 49.1°; M_α 43.38; M_D 43.64; M_β-M_α 1.03; M_γ-M_α 1.74. Another specimen m. 32–3°; b_{12} 86–6.5°; $d_4^{37.9}$ 0.9661; $d_4^{37.6}$ 0.9663; n_α 1.44307; n_D 1.44678; n_β 1.45571; n_γ 1.46324 at 37.6°; M_α 43.38; M_D 43.70; M_β-M_α 1.07; M_γ-M_α 1.70; EM (mean) 1.63, 1.70, 0.31 and 0.55, resp.; $E\Sigma$ (mean) 1.03, 1.08, 42% and 47%, resp. Et pyruvate, b_{17} 55°; $d_4^{15.6}$ 1.0596; n_α 1.40606; n_D 1.40830; n_β 1.41361; n_γ 1.41825 at 15.6°; M_α 26.92; M_D 27.05; M_β-M_α 0.44; M_γ-M_α 0.71; EM 0.10, 0.10, 0.01 and 0.02, resp.; $E\Sigma_D$ 0.09. Et levulate, b_{16} 95°; $d_4^{16.2}$ 1.0168; n_α 1.42192; n_D 1.42416; n_β 1.42955; n_γ 1.43415 at 16.2°; M_α 36.01; M_D 36.17; M_β-M_α 0.57; M_γ-M_α 0.92; EM —0.01, —0.02, ±0.00 and ±0.00, resp.; $E\Sigma_D$ —0.01. Et diethylacetoacetate, b_{17-8} 104°; $d_4^{17.2}$ 0.9707; n_α 1.43031; n_D 1.43266; n_β 1.43806; n_γ 1.44269 at 17.2°; M_α 49.56; M_D 49.79; M_β-M_α 0.77; M_γ-M_α 1.24; EM —0.25, —0.25, —0.01 and —0.02, resp.; $E\Sigma_D$ —0.13. J. Bishop Tingle.

Synthesis of 1,1-Diaryl Substituted Arabitol. C. Paal and Max Kinscher. Pharm. Chem. Inst., Univ. Erlangen. *Ber.*, **44**, 3543–55.—*Triacetyl-l-arabonic lactone*, formula (I) below, prismatic crystals, m. 52–4°; $[\alpha]_D^{18.5}$ —60.45° in C_6H_6. With PhMgBr it



(I)



(II)

gives *1,1-diphenyl-l-arabitol* (II); concentric needles, m. 171°; in H_2O, $[\alpha]_D^{20}$ 85.6°. Yield, 15–6%. *2,3,4,5-Tetrabenzoyl-1,1-diphenylarabitol*, needles, m. 181–2°. At 140°, $KMnO_4$ oxidizes it to benzophenone and BzOH. *Anhydro-1,1-diphenylarabitol* (*1,1-diphenyl-2,3-dihydroxy-4-methyloltetrahydrofurfuran*) (III) from (II) and HNO_2; plates, m. 172-4°; in acetone $[\alpha]_D^{18}$ —114.8°. Some benzophenone is formed together with (III) and is also produced together with an acid, probably mesotartaric acid, from $KMnO_4$ and (II). With $KMnO_4$ (III) gives benzophenone and *1,1-diphenyl-2,3,4-*

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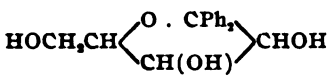
trihydroxytetrahydrofuran-4-carboxylic acid (*diphenylaldoerythrosecarboxylic acid*) (IV); needles, softens 111°, m. 117°; in alc. $[\alpha]_D^{14}$ 199.5°; $[\alpha]_D^{17}$ 201.7°. *Silver, zinc, calcium*



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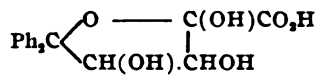
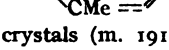


(IV)

and *barium salts*. *Phenylhydrazone*, or *phenylosazone*. *1,1-Di-p-tolyl-l-arabitol*, like (II); prisms, m. 186–7°; in abs. alc. $[\alpha]_D^{18}$ 71.62°. *1,1-Dibenzyl-l-arabitol*, needles, m. 156–7°; in H_2O, $[\alpha]_D^{19}$ 31.5°; in abs. alc., $[\alpha]_D^{17.5}$ 31.5°. J. Bishop Tingle.

Two Methods of Treating the Problem of Substitution in the Benzene Nucleus. A. F. Holleman. Amsterdam. *Ber.*, **44**, 3556–62.—Reply to Obermiller (*C. A.*, **6**, 374) and a summary of H.'s views. J. B. T.

Chemistry of the Action of Atoxyl (*p*-Aminophenylarsinic Acid). M. Nierenstein. Biochem. Lab., Univ. Bristol. *Ber.*, **44**, 3563.—A claim for priority as against Bertheim (*C. A.*, **6**, 369) regarding the parasitocidal influence of the NH_2 in phenylarsinic acid (cf. *Ann. trys. med. and parasit*, **2**, 254 (1908)). J. Bishop Tingle.

Correction of an Old Statement Regarding Phenylmethyltriazole. Eug. Bamberger. *Ber.*, **44**, 3564–5.—Contrary to the statement of Bamberger and de Gruyter (*Ber.*, **26**, 2385 (1893)), 1-phenyl-5-methyltriazole,  , is an oil, as described by Bladin (*Ber.*, **18**, 1548 (1885)). The crystals (m. 191°) consist of cyanophenylacetamidine, NCNHCMe : NPh and not of 1-phenyl-5-methyltriazole as B. and de G. supposed (cf Pellizarri, *C. A.*, **5**, 3806). J. Bishop Tingle.

Diazohydrazide from Diazotetrazole. Contribution to Knowledge of Nitrogen Chains. K. A. Hofmann and Heinrich Hock. Berlin. *Ber.*, **44**, 2946–56.—Diazotetrazoleaminoguanidine, $HN_4CN_2NHNHC(:NH)NH_2$, is very stable. *Periodide*, $C_2N_7H_{10}I_2$, cubes, pleochroic from brown to black. It explodes violently in contact with A NO_2 + HNO_3. The tetrazole does not react with BzH, nor with pptd. HgO; with Fehling's soln. it evolves N. B., dil. H_2SO_4 hydrolyzes it to C_2N_2, N and aminotetrazolic acid (1 mol.). Guanylnitrosoaminoguanyltetrazene, $H_2ON\,CN_2NHNHC(:NH)NH_2$, gives, with aq. NaOH, NH_3, cyanamine and tetrazylazoimide; with hot, dil. acids N (2 ats.), aminotetrazolic acid (1 mol.), C_2N_2, N_2H_4 and carbamid; with hot H_2O, N (4 ats.) and tetrazylazoimide. *Diazotetrazole emicarbazide*, $HN_4CN_2NHNHCONH_2.H_2O$, from semicarbazine hydrochloride, AcONa and diazotetrazole; doubly refractive crystals, m. 122°, explodes at a higher temp. It is very stable and has an acid reaction towards litmus. Hot, aq. alkali hydrolyzes it slowly to tetrazylazoimide and carbamide. *Diazotetrazolebenzalaminoguanidine*, $HN_4CN_2N(NC_7H_6)C(:NH)NH_2$, from benzalaminoguanidine and diazotetrazole; orange-red needles, decomp. about 132°. With acids it gives N, C_2N_2, BzH and N_2H_4. *Sodium salt*, orange-red needles. It is hydrolyzed slowly by alkalies to the preceding substances. *Diazotetrazolephenylhydrazide*, $HN_4CN_2NPhNH_2$, from diazotetrazole and phenyldiazonium salts; orange-yellow crystals, decomp. 139°. It is hydrolyzed to PhN_2H_3, C_2N_2 (0.5 mol.) and N (5 ats.). *Sodium salt*, brownish red. These results show that the unsym. chain RN : $NNRNH_4$, is hydrolyzed to N, N_2H_4 and 2ROH. *Bisdiazotetrazolehydrazide*, $HN_4CN_2NHNHN_2CN_4H$, from diazotetrazole, N_2H_4.HCl and AcONa, doubly refractive flakes, stable at 25°, explodes violently at 90°, or when pressed with a rod. With acids it gives C_2N_2, N (5 ats.), NH_3 and tetrazylazoimide. *Sodium salt*, yellow, doubly refractive plates. With H_2O it gives N, tetrazylazoimide and aminotetrazole. *Dicyanodiamidine diazoaminotetrazolate*, $HN_4CN : NNHCN_4H$, from di-

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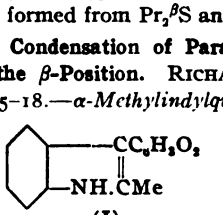
cyanodiamidine sulfate, diazotetrazole and AcONa; yellow needles. Aq. NaOH, followed by alc. gives *sodium diazoaminotetrazolate*, $C_2N_{11}Na_3.H_2O$; yellow, doubly refractive needles. *Guanidine salt.* J. BISHOP TINGLE.

Formation in the Animal Organism of Methyl Propyl Ketone from Diethylacetic Acid. L. BLUM AND MAX KOPPEL. Univ. Strassburg. *Ber.*, 44, 3576–8.—Emden and Wirth (*C. A.*, 4, 3092) have stated that "acetone compds." are formed from diethylacetic acid by the animal organism. The product obtained from the urin of dogs fed with Na diethylacetate is Me Pr ketone; α-ethylacetoacetic acid is, perhaps, an intermediate product. It is probably impossible to det. acetone in presence of other ketones containing Ac. J. BISHOP TINGLE.

4-Amino-3-hydroxyphenylarsinic Acid and its Reduction Products. L. BENDA. Mainkur. *Ber.*, 44, 3578–82.—Diazotized 3-nitro-4-aminoarsanilic acid and β-naphthol form a *dye*, $HOC_{10}H_6N(:N)C_6H_3(OH)AsO_3H_2$; coppery lustrous crystals. It is reduced by Al or Na hyposulfite to *4-amino-3-hydroxyphenylarsinic acid*, $H_2NC_6H_3(OH)AsO_3H_2$; cryst. Its *diazonium compound* is lemon-yellow and it gives a red *azo derivative* with resorcinol. *Sodium salt*, scales with 5 H_2O. *Silver* and *magnesium salts*: Under other conditions Na hyposulfite reduces the above naphthylazo compd. to *4,4'-diamino-3,3'-dihydroxyarsenobenzene*, $H_2NC_6H_3(OH)As:AsC_6H_3(OH)NH_2$; yellow flocks. *Hydrochloride*, yellow powder. *Diazonium compound*, intensely yellow. *1,8,4-Aminonaphtholsulfonic acid azo compound*, blue. The arsenobenzene compd. may be titrated with "nitrite" and it may also be prepared from 4-amino-3-hydroxyphenylarsinic acid. This latter, with SO_2 + HI gives *4-amino-3-hydroxyphenylarsenious oxide*; amorphous powder, readily sol. in acids, or alkalies. J. B. TINGLE.

Intramolecular Rearrangement of Aliphatic Sulfoxides. THOMAS P. HILDITCH. Univ. College, London. *Ber.*, 44, 3583–9.—*Diisoamylsulfoxide*, $(Me_2CHCH_2CH_2)_2SO$, from diisoamyl sulfide and H_2O_2, in acetone; m. 38–40°. With dry HCl, in abs. alc., or with Ac_2O it gives isoamylmercaptan and isovaleraldehyde. Thionyldiacetic acid, $(HO_2CCH_2)_2SO$, and HCl form thioglycollic acid and, after oxidation, $C_2H_2O_4$. *α-Thiodiisobutyric acid*, $(HO_2CCMe_2)_2S$, from α-bromoisobutyric ester and Na_2S; m. 138°. With acetone and H_2O_2 it forms *α-thionyldiisobutyric acid*, $(HO_2CCMe_2)_2SO$: plates, m. 186°. It is not changed by HCl in abs. alc. *α-Thionyldiisopropionic acid*, $(HO_2CCHMe)_2SO$, could not be prepared from α-thiodipropionic acid and H_2O_2, but was formed from $Pr_2^{\beta}S$ and H_2O_2; oil. J. BISHOP TINGLE.

Condensation of Paraquinones with Indoles and Pyrroles Containing Hydrogen in the β-Position. RICHARD MÖHLAU AND ALFRED REDLICH. Dresden. *Ber.*, 44, 3605–18.—*α-Methylindylquinone*, formula (I) below, from benzoquinone and α-methyl-



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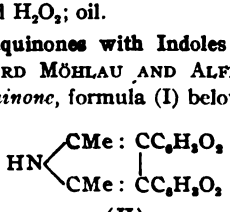

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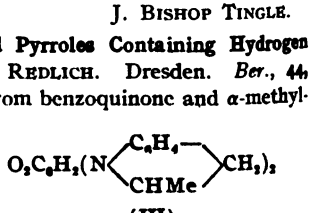

(III)

indole; bronze-lustrous needles, m. about 185°. Yield, quant. It is accompanied by hydroquinol. Aq. KOH hydrolyzes (I) to methylketole and, probably, hydroxyquinone. *Diacetyl-α-methylindylhydroquinol*, $C_{19}H_{17}O_4N$, from (I), Ac_2O, Zn dust and AcONa; needles, m. 132°. Yield, quant. *N-Methyl-α-methylindylquinone*, $C_{10}H_{13}O_2N$, from *N*-methyl-α-methylindole and benzoquinone; violet-black needles, m. 160°. Yield, 90%. *α-Methylindyltoluquinone*, violet needles, m. about 195° (decomp.). Yield, 80%. *Diacetyl-α-methylindyltoluhydroquinol*, needles, m. 146°. Yield, 70%. *α-Phenylindylquinone*, $C_{20}H_{13}O_2N$, blue needles, m. about 205°. Yield, 40%. *2,5-Dimethylindylquinone*, from 2,5-dimethylindole; violet-black needles with a bronze luster, m. about 201° (decomp.). Yield, 90%. *2,5-Dimethylindyltoluquinone*, reddish

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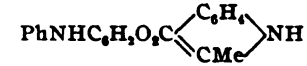
violet needles. Yield, 90%. *3,4-Diquinonyl-2,5-dimethylpyrrole* (II), from 2,5-dimethylpyrrole and benzoquinone; black powder. Yield, 30%. Hydroquinol is formed simultaneously. *3,4-Diquinonyl-2-methyl-5-phenylpyrrole*, dark brown flocks, decomp. without m. Yield, 48%. *Bishydromethylketolequinone* (III), from benzoquinone and hydromethylketole; brown needles with a blue luster, m. 187°. Yield, 60%. Bismethylanilinoquinone, $O_2C_6H_2(NMePh)_2$, from benzoquinone and PhNHMe; reddish brown, metallic lustrous plates, m. (decomp.). Yield, 80%. *2-Anilino-5-α-methylindylquinone* (IV), from (I) and $PhNH_2$; brown needles. *Bistetrahydro-*



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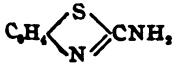
quinolinoquinone, $O_2C_6H_2(C_9H_{10}N)_2$, from tetrahydroquinoline and benzoquinone; brown needles, m. 189°. Yield, 45%. *Bistetrahydro-p-toluquinilinoquinone*, $O_2C_6H_2(C_{10}H_{12}N)_2$, from tetrahydro-*p*-toluquinoline; dark cubes with a green luster, m. 197°. Yield, 40%. J. Bishop Tingle.

Aminosulfones and Related Compounds. S. Gabriel and J. Colman. Univ. Berlin. *Ber.*, 44, 3628–36.—*Phthalyltauryl chloride*, $C_6H_4(CO) : NC_2H_4SO_2Cl$, from phthalyltaurine and PCl_5; plates, m. 160°. *Methyl ester*, from MeONa; plates, m. 103–4°. Benzoyltaurine, $BzNHC_6H_4SO_3H$, plates (not a sirup), m. 165–6.5°. *Phthalimidoethylphenylsulfone*, $C_6H_4(CO)_2 : NC_2H_4SO_2Ph$, from phenylsulfinic acid, alc., Na and bromoethylphthalimide; needles and plates, m. 185–5.5°. With conc. HCl + glacial AcOH it gives *β-aminoethylphenylsulfone hydrochloride*, $HCl.NH_2C_2H_4SO_2Ph$; needles m. 155–5.5°. *γ-Phthalimidopropylphenylsulfone*, $C_6H_4(CO)_2 : N(CH_2)_3SO_2PH$, from iodopropylphthalimide and phenylsulfinic acid as above; plates and needles, softens 115°, m. 126°. With HCl it gives *γ-aminophenylsulfone hydrochloride*, $HCl.NH_2(CH_2)_3SO_2Ph$; plates, m. 222°. *Chloroplatinate*, cryst. *Amine*, oil. *Phthalyl-β-aminoethylphenyl sulfide*, $C_6H_4(CO)_2 : N(CH_2)_2SPh$, from phenylmercaptan, bromoethylphthalimide, KOH and alc.; needles, m. 59–60°. With HCl it gives *β-aminoethyl phenylsulfide hydrochloride*, $HCl.NH_2(CH_2)_2SPh$; plates, softens 110-20°, m. 160-1°. *Phthalimidoethyl disulfoxide*, $[C_6H_4(CO)_2 : NC_2H_4]_2S_2O_2$, from phthalimidomercaptan and HNO_2; plates, m. 155–6°. HCl hydrolyzes it to diaminodiethyldisulfide. *Phthalimidoethylsulfinic acid*, $C_6H_4(CO)_2 : N(CH_2)_2SO_2H$, from phthalimidoethyl disulfoxide, $AlCl_3$ and C_6H_6; plates, m. 149–9.5° (gas evolution). It is also formed from the disulfoxide, or from phthalyltauryl chloride and Zn dust. With HCl it gives phthalic acid and taurine. Aminopropylphenylsulfone is more toxic than aminoethylphenylsulfone. A similar difference is shown by aminoethylmethyl sulfide hydrochloride and aminoethylphenyl sulfide hydrochloride. J. B. T.

Electrolytic Reduction of Nitrated Benzenethiocyanates. Fr. Fichter and Theodor Beck. Basel. *Ber.*, 44, 3636–48.—Unless otherwise stated the compds. mentioned below were electrolyzed in alc. H_2SO_4, with Pb cathodes. Phenyl thiocyanate gave thiophenol. Yield, 57.5%. *o*-Nitrophenyl thiocyanate, in alc. HCl. gave chiefly, and sometimes exclusively, *μ*-aminobenzothiazole (I), together with



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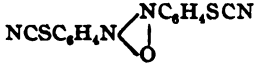

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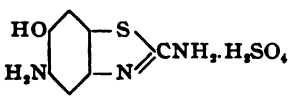

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o-aminophenylmercaptan. With a Cu cathode, the product is *2-amino-5-hydroxyphenyl thiocyanate*, $H_2NC_6H_2(OH)SCN$; plates, m. 121°. *Sulfate*, $C_7H_6ON_2S.H_2SO_4.H_2O$, needles. *N-Acetyl derivative*, needles, m. 206° (decomp.). *N,o-Diacetyl de-*

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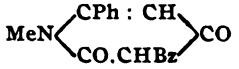
rivative, plates, darkens about 170°, m. 183°. *2-Acetamino-5-methoxyphenyl thiocyanate*, needles, m. 81°. *2-Azo-β-naphthol-5-hydroxyphenyl thiocyanate* from β-naphthol and the diazotized amine; red needles, m. 130°. *4-Aminophenyl thiocyanate* from *p*-nitrophenyl thiocyanate (Pb or Cu cathode and alc. HCl); oil. *Hydrochloride*, cryst. *Acetyl derivative*, needles, m. 181°. As intermediate product of the reduction, *4,4'-dithiocyanoazoxybenzene* (II), is formed; reddish yellow plates, m. 170–1°. 2,4-Dinitrophenyl thiocyanate gives *4-μ-diamino-5-hydroxybenzothiazole sulfate* (III); needles. *Hydrochloride* by reduction in alc. HCl. *N,N-Diacetyl derivative*, needles, m. 268°. *4-Acetamino-μ-amino-5-methoxybenzothiazole*, from the di-Ac deriv., aq. NaOH and Me_2SO_4; small crystals, m. 257–8°. With a Cu cathode, in alc. H_2SO_4, the product is *2-amino-4-nitro-5-hydroxyphenyl thiocyanate sulfate*, $NCSC_6H_2(NO_2)NH_2.H_2SO_4$; pale red crystals. *N,o-Diacetyl derivative*, pale yellow and microcryst. Further reduction with Cu cathode gives *2,4-diamino-5-hydroxyphenyl thiocyanate sulfate*, $NCSC_6H_2(NH_2)_2OH.H_2SO_4.H_2O$; light gray plates. *N,N'-Diacetyl derivative*, needles, m. 217°. *N,N O-Triacetyl derivative*, needles, m. 156°. J. B. T.

Mutual Replacement of Ammonia and of the Amines in the Molecule of Pyridone Derivatives. Action of Methylamine and of Aniline on Dehydrobenzoylacetic Acid. P. Petrenko-Kritchenko and Joh. Schöttle. Univ. Odessa. *Ber.*, 44, 3648–54; cf. *C. A.*, 6, 94.—*Dehydrobenzoylacetic-N-methyllactam* (I) from dehydrobenzoylacetic



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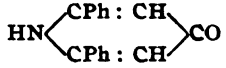

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or its lactam and $MeNH_2$; cryst., m. 188°. Yield, very good. Aq. HCl converts it into a *compound*, probably (II); m. 176–8°. *Chloroplatinate*, yellow, m. 218–21° (decomp.). *Dehydrobenzoylacetic-N-phenyllactam* from dehydrobenzoylacetic acid, its lactam, or (I) and $PhNH_2$; yellow crystals, m. 203°. Yield, very good. Aq. HCl hydrolyzes it to α,α-diphenylpyrone and other compds. Alc. NH_3 converts (I) into dehydrobenzoylacetic lactam. J. Bishop Tingle.

***o*-Hydroxyacetophenone, *o*-Hydroxy-5-chloroacetophenone and Chlorochalkones and Chloroflavones.** Franz Kunckell. Univ. Rostock. *Ber.*, 44, 3654–6.—*o*-Hydroxyacetophenone is formed by b. 2-hydroxy-5-acetaminoacetophenone with HCl and diazotizing the product. In the same way 2-hydroxy-5-amino-ω-chloroacetophenone gives *2-hydroxy-5-ω-dichloroacetophenone*; needles, m. 64°. *2-Hydroxy-5-bromo-ω-chloroacetophenone*, yellow needles, m. 68°. *5-Chloro-2-hydroxychalkone*, $HOC_6H_3ClCOCH : CHPh$, from BzH and 5-chloro-2-hydroxyacetophenone; yellow needles, m. 108°. *Sodium salt*, yellow crystals. *Dibromo derivative*, $HOC_6H_3ClCO-CHBrCHBrPh$, cubes, m. 185°. J. Bishop Tingle.

Constituents of Ethereal Oils. Determination of the Constitution of Active Caryophyllene; Degradation of Active Caryophyllene to Monocyclic Derivatives. F. W. Semmler and Erwin W. Mayer. Breslau. *Ber.*, 44, 3657–79.—Caryophyllene forms 2 *ozonides*, $C_{15}H_{24}O_6$ and $C_{15}H_{24}O_7$, or $C_{15}H_{24}O_8$. AcOH decomp. the mixt. into acidic products (*A*) and neutral substances (*B*). *A* consists of the acids $C_8H_{14}O_2$, $C_{11}H_{18}O_3$ and $C_{14}H_{22}O_4$. *Ketocarboxylic acid*, formula (X) below, yellowish green oil, $b_{11\cdot5}$ 183–7°; d_{20} 1.040; α_D^{20} 44°; n_D^{20} 1.4677; mol. ref. 52.92. *Silver salt*. *Methyl ester*, liquid, $b_{15\cdot5}$ 139–42°; d_{20} 0.9913; n_D^{20} 1.4527; α_D^{20} 42°; mol. ref. 57.47. *Semicarbazone*, prisms, m. 183°. HNO_3 (27%) oxidizes (X) to dimethylsuccinic acid and a *dicarboxylic acid*, $C_9H_{14}O_4$, (*caryophyllenic acid*); sirup, b_9 215–8°; b_{13} 222–5°. *Silver salt*. *Copper salt*, light blue. *Dimethyl ester*, b_{11} 127–31°; d_{20} 1.0456; n_D^{20} 1.4462; α_D^{20} 44°; mol. ref. 54.66. *Anhydride*, pale yellow oil, b_{10} 152–8°; d_{20} 1.1399; n_D^{20} 1.4755; α_D^{20} —28°; mol. ref. 41.78. Alk. Br water and the acid $C_{11}H_{14}O_3$ form $CHBr_3$, CBr_4, dimethyl-

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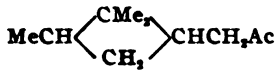
succinic and caryophyllenic acids. $KMnO_4$ acts like HNO_3. *Dikctocarboxylic acid*, $C_{14}H_{22}O_4$, yellow oil, $b_{11\cdot5}$ 229–32°; d_{20} 1.0830; n_D^{20} 1.4804; α_D^{20} 41°; mol. ref. 66.53. *Silver salt*, darkens 130°, m. about 145°. *Methyl ester*, liquid, b_{12} 184–8°; d_{20} 1.047; α_D^{20} 38°; n_D^{20} 1.4680. *Semicarbazone*, softens 96°, m. about 120° (decomp.). With HNO_3 the acid gives succinic and caryophyllenic acids. Alk. Br water acts like HNO_3. *Acid*, $C_9H_{14}O_2$, liquid, b_9 120–8°; d_{20} 0.9827; n_D 1.4457; α_D 17°. *Methyl ester*, b_9 64–8°; d_{20} 0.922; α_D^{20} 20°; n_D 1.4316; mol. ref. 43.23. *Amide*, m. 96°. *B. Ketone* (I), pale green liquid, $b_{11\cdot5}$ 73–6°; d_{20} 0.8823; n_D^{20} 1.4387; α_D —7°; mol. ref. 45.93. *Semicarbazone*, plates, m. 176°. Alc. and Na reduce the ketone to an *alcohol*, $C_{10}H_{20}O$; $b_{11\cdot5}$ 87–9°; d_{20} 0.8707; n_D^{20} 1.4507; α_D^{20} —6°; mol. ref. 48.26. *Chloride*, b_{10} 70–3°; d_{20} 0.882. *Hydrocarbon*, oil, $b_{11\cdot5}$ 50–4°; d_{20} 0.812; n_D^{20} 1.4410; α_D^{20} —6°; mol. ref. 44.20. Alk. Br water oxidizes (I) to CBr_4 and an *acid* (II); oil, $b_{13\cdot5}$ 131–3°; d_{23} 0.9773; n_D^{20} 1.4500;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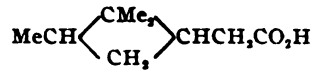
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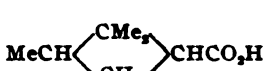
α_D^{20} —7°; mol. ref. 43.06. *Silver salt*, darkens about 160°, m. 219°. *Methyl ester*, oil, b_{15} 86–9°; d_{22} 0.9208; n_D^{20} 1.4360; α_D^{20} —5.5°; mol. ref. 48.30. *Amide*, plates. m. 114°. With HNO_3 (I) gives an *acid* (III), liquid, b_{12} 119–22°; d_{20} 0.972; n_D^{20} 1.4457;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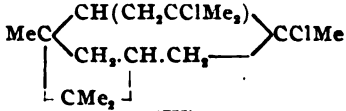
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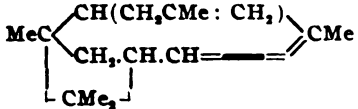
α_D^{20} 7.5°; mol. ref. 38.96. *Methyl ester*, liquid, b_{13} 69–73°; d_{20} 0.9359; n_D^{20} 1.4307; α_D^{20} 2°; mol. ref. 43.15. *Amide*, prisms, m. 115–6°. *Diketone*, $C_{12}H_{20}O_2$, formed together with (I); oil, b_9 137–42°; d_{20} 0.9600; n_D^{20} 1.4677; α_D^{20} 34°; another specimen with the same b. p. had d_{20} 0.9598; n_D 1.4622; α_D 39°. *Semicarbazone*, m. 219°. With HNO_3 or alkaline Br water the diketone gives dimethylsuccinic and caryophyllenic acids. *Diketoaldehyde*, $C_{14}H_{22}O_3$, is the chief product of the ozonization; yellowish green oil, b_{12} 181–4°; d_{20} 1.0280; n_D^{20} 1.4774; α_D^{20} —25°. With semicarbazine it gives a *compound*, b. 80°, m. about 116° (?). $KMnO_4$ oxidizes the diketoaldehyde to the above diketo acid, $C_{14}H_{22}O_4$. With HNO_3 the diketoaldehyde gives succinic and caryophyllenic acids. Deussen's caryophyllene gives a dihydrochloride (IV) (m. 68–9°) identical with that from natural caryophyllene. From it "regenerated" *d*-caryophyllene is produced. Na reduces Deussen's blue nitrosite to an *amine*, $C_{15}H_{27}N$; liquid, b_{12} 148–50°; d_{20} 0.9297; α_D^{20} 13°; n_D^{20} 1.5030; mol. ref. 70.23. These results indicate that crude caryophyllene, as it occurs in nature, consists of Deussen's inactive *α*-caryophyllene, which is probably identical with "humulene," "limonene" caryophyllene (V) and "terpinolene" caryophyllene (VI). The above (*B*) compds. are assumed to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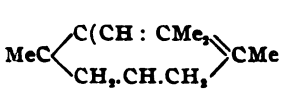
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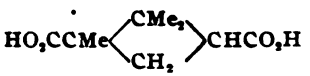
be derived from (VI), the (*A*) compds. form (V). Caryophyllenic acid (VII) from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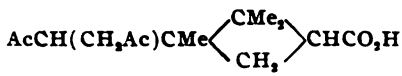
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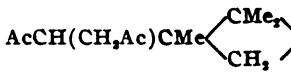
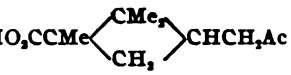


(IX)



(X)

both (V) and (VI). The diketo acid (VIII) and aldehyde (IX) are from (V). The acid (X) from (VI). J. BISHOP TINGLE.

Copper Compounds of Acetylene (MANCHOT). 21. Molecular Complexity in the Liquid State (GUYE). 2. Binary Systems of which One Component is an Organic Substance (MENSHUTKIN). 2. Chloro- and Bromo-platinates and Stannates of the Tetraalkylamines (RIES). 8. Inversion of Saccharose by Ultraviolet Rays (EULER, OHLSEN). 28. Formation of Fumaric Acid by Molds (EHRLICH). 11c.

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11. BIOLOGICAL CHEMISTRY.

WILLIAM J. GIES.

A. GENERAL.

FRANK P. UNDERHILL.

Aldebrandino di Siena's "Regimé du Corps." E. O. VON LIPPMANN. *Chem. Ztg.*, 36, 2–4. E. J. C.

The Nomenclature of Enzymes. HANS EULER. *Z. physiol. Chem.*, 74, 13–4.—It is proposed to distinguish by the termination "ese" those enzymes of which the only known action is a synthetizing one, *e. g.*, "nitrilese" = the enzyme ("σ-emulsin" of Rosenthaler) which catalyzes the formation of nitriles. A. HUNTER.

The Mode of Action of Phosphatese. I. H. EULER AND S. KULLBERG. Stockholm. *Z. physiol. Chem.*, 74, 15–28.—Exts. of yeast or *Aspergillus niger* contain an enzyme, "phosphatese," which, acting upon a mixt. of phosphate and the intermediate products of alc. fermentation, effects the synthesis of a carbohydrate ester. Its action is apparently irreversible, and may, under suitable conditions, lead to the entire disappearance of PO_4^{---}. It is very unstable, being nearly destroyed in $^1/_2$ hr. at 60°. The reaction is most rapid in weak alk. soln. The nature of the reacting substances was not ascertained; it is not $CH_2OHCOCH_2OH$; it arizes with equal rapidity from glucose, fructose, or sucrose. The ester is optically inactive, and no active products are obtained by hydrolyzing it with acid or alkali. A. HUNTER.

Further Comment on Our Communication on "The Mode of Action of Phosphatese." H. EULER AND S. KULLBERG. *Z. physiol. Chem.*, 76, 241; cf. preceding abstr.—A discussion of the investigations of Lebedev (*C. A.*, 6, 499, 599) in which L. finds that dioxyacetone is esterified by phosphates to a considerable degree. The authors point out that this does not agree with L.'s and their own former results. These differences may be accounted for by the different varieties of yeast used.

G. M. MEYER.

The Fluorescence of Animal Tissues in Ultraviolet Light. HANS STUBEL. Univ. Jena. *Arch. ges. Physiol.*, 142, 1–14.—With a specially constructed absorption app. S. was able to produce with the arc light a source for ultraviolet light of such intensity as to permit of the study of the fluorescence of various tissues. Practically all the tissues studied gave a bluish white fluorescence. Important exceptions were all animal pigments, and hemoglobin and its derivs. These do not fluoresce and either diminish or prevent entirely the fluorescence of tissues of which they are a part. Likewise substances which go to make up the tissues were found to fluoresce with varying intensity in both solid form and in soln. The less water a tissue contained the greater

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the fluorescence. The nails and unpigmented hair fluoresce more strongly than the skin. WALTER A. JACOBS.

The Identity of the Guanine Pentoside from Molasses with Vernine. E. SCHULZE AND G. TRIER. Zürich. *Z. physiol. Chem.*, 76, 145–7.—The guanosine pentosides obtained from guanosine by the cleavage of nucleic acid (Levene and Jacobs), from molasses (Aucerliks) and vernine (Schulze and Castro) are identical. This guanine-*d*-ribose is the only pentoside known to occur in nature. It is suggested to designate this pentoside as vernine. G. M. MEYER.

Fermentative Decomposition of Hydrogen Peroxide. G. SENTER. *Z. physiol. Chem.*, 74, 101–3.—Remarks on the paper of Waentig and Steche (cf. *C. A.*, 5, 3588). A. HUNTER.

Enzymic Hydrogen Peroxide Decomposition. PERCY WAENTIG AND OTTO STECHE. Univ. Leipzig. *Z. physiol. Chem.*, 76, 177–213; cf. *C. A.*, 5, 3588.—Numerous catalase preps. of animal organs, liver, fat, sexual organs of *Rana temporaria*, pupae and larvae of *Malacosoma neutria*, also of plants, fungi and yeast were examd. as to their power of decomposing H_2O_2. All of these preps. are identical and resemble Senter's hemase especially when slight variations in the equil. of the H and OH ions are brought about. The CO_2 content of distilled water is even sufficient to cause a retardation of the reaction. Impurities in the catalase prep. reduce its sensitiveness. When the catalase solns. were subjected to the action of light (ultraviolet, quartz Hg lamp) a decided lowering of the enzyme activity was noted. This action, was most pronounced in alk. solns. G. M. MEYER.

Lutein Obtained from Egg Yolks. R. WILLSTAETTER AND H. H. ESCHER. Zürich. *Z. physiol. Chem.*, 76, 214–25.—The yolks of 6000 eggs (110 kg.) were coagulated with alc. The coagulum was extracted with acetone. Lecithin and cholesterol were pptd. from the acetone soln. by petrol-ether. Crude lutein crystallizes out of the conc. petrol-ether (yield 4 g.). Recrystallized from MeOH with 1 mol. MeOH. For analysis it was recrystd. out of $CHCl_3$ and also CS_2. Mol. wt. = 624; $C_{40}H_{56}O_2$. Except for the m. p. 192–3° it is identical with xanthophyl. It can be distinguished from carotin by its greater solubility in EtOH and MeOH. Lutein solns. are golden yellow. When exposed to air lutein readily absorbs O, especially if not very pure. The absorption spectra of xanthophyl and carotin were established. G. M. MEYER.

Biology of Enzymes. Action of Pancreatic Lipase. SABATO VISCO. *Atti accad. Lincei*, 20, I, 780–7.—In a no. of tubes in a thermostat at 40° were placed 1 cc. pancreatic juice and 2 cc. oil of sweet almonds (almost pure triolein) and when titration showed no more fatty acid was being liberated, fresh juice was added to some, fresh oil to others; in the former, more acid was liberated; in the latter there was generally an increase in the abs. amt. but a decrease in the % of acid liberated. This shows that the enzyme is not destroyed by more or less prolonged heating at 40°, but that its activity has been modified. Bile added to very active, fresh juice merely accelerates the lipolytic power without displacing the limit. The repeated addition of fresh juice can of itself markedly increase the hydrolysis of the fat, but in this process bile not only does not increase the abs. amt. of hydrolysis but neither does it increase the velocity; in some cases it even seems to impede the hydrolysis.

CHAS. A. ROUILLER.

Penetration of Salts into the Protoplasm and the Nature of the Toxic Action. J. DE RUFZ. *Ann. Sci. Nat. Bot.*, (9 *ser.*) 14, 97–189; *Expt. Sta. Record*, 25, 730; cf. *C. A.*, 5, 2398.—R. gives discussions on the general properties of colloids and of protoplasm and on the general properties of salts in regard to their possible mode of action on the protoplasm, and the action of and toxicity induced by the salts. For

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weak solns. cations of alkalies and alkaline earths combined with a non-toxic anion easily penetrated the protoplasm. The salts of Ba, of Cs and of I penetrated the protoplasm with difficulty. Certain salts of Al and Yt and a large majority of the salts of the heavy metals do not penetrate the living protoplasm. Contrary to current opinions, the permeability of the protoplasm to weak solns. is an absolutely different phenomenon from its permeability to strong solns. The protoplasm, under the influence of strong solns., becomes completely permeable, without, however, being killed by those salts which in weak solns. are unable to penetrate it. Protoplasm considered in its entirety as a membrane is then a modifiable membrane. R. claims to have established 2 facts as to the toxicity of the salt: (1) The toxic action of a mol. is approx. a property of acid and basic radicals for a large number of salts; this is due to properties acquired by the mol. by reason of its non-satn. by the acids and bases; (2) the toxic salts are those which do not penetrate at all or only with difficulty the living protoplasm when they are employed in weak solns.; solns. of non-toxic salts, on the contrary, easily penetrate the protoplasm. Protoplasm seems to be a very unstable substance as regards a large number of salts. J. J. M.

Chemo-biological Study of the Relations of Pepsin to So-called Antipepsin. WALTER W. HAMBURGER. Chicago. *J. Exp. Med.*, **14**, 535–49.—Fresh and inactivated animal serum under proper conditions will bind pepsin quantitatively in weak acid soln. and prevent its action on protein even after addition of free HCl. This binding and inactivation cannot be considered due to a sp. antipepsin but to a deviation. This pepsin deviation has been responsible for most, if not all, published accounts of an antipepsin. By the method used to control pepsin deviation no normal antipepsin could be demonstrated in the serum of the dog, cat, guinea pig, beef, horse, rabbit or of man. W. A. J.

Velocity of Saccharification of Starch (VAN LAER). **28.**

B. METHODS AND APPARATUS.

STANLEY R. BENEDICT.

Modification of Riegler's Method for Urea Determination in the Urin. TH. EKECRANTZ AND K. A. SOEDERMAN. Stockholm. *Z. physiol. Chem.*, **76**, 173–6.—Riegler (*Ibid.*, **33**, 49) decomposes urea with Millon's reagent and measures the vol. of CO_2 and N evolved. The modification consists in adopting the Dumas method for N so that CO_2 is absorbed and N alone measured. G. M. MEYER.

Kjeldahl Nitrogen Determination. M. SIEGFRIED AND O. WEIDENHAUPT. Univ. Leipzig. *Z. physiol. Chem.*, **76**, 238–40.—If $KMnO_4$ is added in small amts. to the digestion mixt. and then brought to a boil there is no danger of loss of NH_3. It is even essential that the digestion mixt. be boiled after each addition of $KMnO_4$ with certain substances. If after b. for 3 min. there is no decoloration, oxidation is complete. G. M. MEYER.

Improvements in the Exact Determination of Nitrogen in Feces. I. K. PHELPS. *Science*, **33**, 342; *Expt. Sta. Record*, **24**, 609.—The difficulties of an exact aliquot and of loss of N in drying the viscous material are met by each of two procedures. The first procedure consists in dehydrating the moist mass by treatment with acidified alc. and ether and filtration. The dry residue is then sifted and the N detd. in the residual material, consisting of undigested material, in the powder obtained by sifting (which represents the residue from food) and in the alc.-ether extract. The second procedure consists in partially decomposing the moist material with conc. H_2SO_4 by heating in a steam bath until a homogeneous mass is produced. This is then aliquoted and the N detd. in the aliquot. The test of accuracy and adaptability of these procedures shows that they are both excellent. J. J. M.

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Quantitative Determination of Globulin by Precipitation with Ammonium Sulfate, and Preparation of Pure Globulin. H. WIENER. Prag. *Z. physiol. Chem.*, **74**, 29–66. —The wt. of protein pptd. from greatly dild. serum by $^1/_2$ satn. with $(NH_4)_2SO_4$ is always less than (81–2%) of that pptd. from the undild. serum. The lower value is the correct one, because, (1) the ppt. from undild. serum carries with it protein belonging properly to other more sol. fractions, (2) that from dil. serum does not, (3) the latter is quite insol. in $(NH_4)_2SO_4$ soln. of the corresponding conc. The ppt. from undild. serum cannot be entirely freed from foreign proteins by washing with $(NH_4)_2SO_4$ soln. The ordinary method of globulin detn. is therefore fallacious. The pptn. must be carried out in serum dild. 15–20 times. One may then either (1) wash the ppt. with $^1/_2$ satd. $(NH_4)_2SO_4$ till the washings are protein-free, coagulate, wash sulfate-free, dry, and weigh, or (2) without washing det. H_2O and total protein of the moist ppt., and H_2O and protein content of the filtrate, calc. from the latter data the protein of the adhering liquid, and subtract it from the total protein on the filter.

A. HUNTER.

The Preparation of Rennin Solutions Containing Little or No Pepsin. OLOF HAMMARSTEN. *Z. physiol. Chem.*, **74**, 142–68.—An acid ext. of calf's stomach is mixed with a neutral soln. of Na caseinate in such proportion that the ppt. just redissolves. Sufficient 0.1 *N* NaOH is then added to fully ppt. the casein. In the clear acid filtrate the relation between pepsin and rennin is entirely different from that in the original ext. In 12 expts. the milk-coagulating power was reduced to $^1/_2$–$^1/_{25}$, while the Mett test for pepsin was negative in all. The more delicate carmin-fibrin test showed that proteolytic action was entirely absent in 1 case, and in the others reduced to $^1/_{40}$–$^1/_{400}$. This is to be accounted for by actual poverty in pepsin, and not merely by the presence of inhibiting substances (proteoses), though these do arize in the prep. of the casein filtrate. Pepsin and rennin are therefore independent enzymes.

A. HUNTER.

The Isolation of the Specific Bile Acids. FRITZ PREGL AND HANS BUCHTALA. Univ. Graz. *Z. physiol. Chem.*, **74**, 198–211.—I. **The Acids of the Bile of Summer Oxen at Graz** (cf. *Monatsh.*, **1903**, 41): After b. with 1.2% NaOH 25 kg. of the bile yielded 674 g. crude acids. Direct application of the process of Langheld (*Ber.*, **51**, 378) failed to effect a sepn.; but by a method involving, (1) liberation of the acids from their Na salts by HCl in the presence of Et_2O, (2) the application of the L. method to the acids in the ethereal ext., (3) esterification of those remaining in the aq. residue, 87.4% of the crude acids were finally obtained in cryst. form; this included 10.8% fat acids (chiefly palmitic and stearic), 51.2% cholic, 13.5% desoxycholic, and 11.9% choleic acids. The high content of fat acids is probably responsible for the difficulty in crystallizing. II. **A New Process for the Isolation of the Three Specific Bile Acids from Ox Bile:** A simplified method is described whereby it is possible to obtain from bile boiled with NaOH 50–70% of the sp. bile acids in cryst. form directly from aq. soln. With Graz ox bile the method was successful at all times of the year; it failed with human bile.

A. HUNTER.

Determination of Sugar in the Urin. IVAR BANG. *Biochem. Z.*, **38**, 168.—In order to decolorize urin for sugar estn. add 1 teaspoonful of Merck's "pro analysi" blood charcoal and 2 cc. alc. to 18 cc. of urin. The alc. decreases the tendency of the charcoal to adsorb sugar.

D. D. VAN SLYKE.

Two Modifications of Fehling's Solution. E. F. HARRISON. *Pharm. J.*, **87**, 746–7.—A report upon Benedict's solns. for detection and estn. of dextrose (*C. A.*, **3**, 2171; **5**, 2256). B.'s claim that his reagent is about 10 times as delicate as Fehling's soln. for detection of dextrose in urin is corroborated. In the use of the quant. soln.

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H. advizes use of an external indicator (starch and KI, or KSCN) in cases where the end point is not sharp. S. WALDBOTT.

Quantitative Determination of Arsenic in Toxicological Analysis. W. NEY. Kiel. *Schweiz. Wochschr.*, 49; 603–4; *Pharm. Ztg.*, 1911, 615–6.—Place a definit amt. of the organic material into a distilling flask, add 100 cc. HCl (1.19), 2.0 g. KBr and 4.0–5.0 g. hydrazine sulfate and distil into receiver containing 200 cc. H_2O until the residue is sirupy. The distilled $AsCl_3$ is titrated with soln. in presence of $NaHCO_3$. The time required is less than 1 hr. Also cf. P. Jannasch and T. Seidel, *C. A.*, 4, 2245. It is probable although not proved that the method is applicable also to organic As compds. *e. g.*, atoxyl (Covelli, *C. A.*, 5, 1396). S. WALDBOTT.

Blood-Soda-Agar as Selective Culture Medium for Vibrio cholerae. P. PILON. Univ. Amsterdam, *Centr. Bakt. Parasitenk., I Abt. Orig.*, 60, 330–3.—For the Dieudonné blood-KOH-agar medium P. substitutes one consisting of 3 parts defibrinated blood containing 13% cryst. Na_2CO_3, with 7 parts of a 4% nutrient agar. This medium may be used in $^1/_2$ to $^3/_4$ hr. after making and eliminates *B. pyocyaneus* better than the original. F. C. KOCH.

Detection by means of Elastin of Active Pepsin in the Contents of the Intestin. EMIL ABDERHALDEN AND OTTO MEYER. Berlin. *Z. physiol. Chem.*, 74, 67–100; cf. *C. A.*, 5, 2492.—Elastin was satd. with 0.1 *N* HCl and washed with H_2O. Pieces of 1 g. were laid in different parts of the excized and opened intestin. After 2 hrs. they were thoroughly washed and kept 24–48 hrs. in 10 cc. H_2O at 37°. Digestion was tested for by the biuret reaction and the optical method. In this way active pepsin was shown to be invariably present in the small intestin of the dog, cat, horse, ox, pig, fowl and tortoise; even the ileum often contained considerable amts. Numerous controls proved the reliability of the conclusions reached. Peptic digestion is, therefore, not confined to the stomach. A. HUNTER.

Determination of Arsenic in Organic Substances (BOHRISCH, KÜRSCHNER). 17. Estimation of Saccharose (BRUCKNER, WELWART). 28.

C. BACTERIOLOGY.

ERNEST D. CLARK.

The Formation of a Gas Containing Phosphorus during Putrefaction. A Contribution to the Biology of B. putrificus, Bienstock. W. KULKA. Vienna. *Centr. Bakt. Parasitenk., I Abt. Orig.*, 61, 336–43.—Cultivation of *B. putrificus* on ox brain in a current of pure H yielded PH_3 or at least a gas containing P, as detd. by the garlic odor and by the Dusant test. A gas containing P was collected from the surface of a biological settling or clarifying tank. F. C. KOCH.

The Disinfecting Power of Complex Organic Mercury Compounds. I. Aromatic Mercury Carbon Acids. W. SCHOELLER AND W. SCHRAUTH. Univ. Berlin. *Z. Hyg.*, 70, 24–34.—Comparative studies on *Staphylococcus pyogenes aureus* and *B. anthrax* with solns. containing Hg in 0.0125 *N* concs. show that *o*-monohydroxy Hg deriv. of BzONa is not as powerful a disinfectant as $HgCl_2$. Substitution products of the Hg compd. with the substituting group in the ortho position to the carboxyl group are more powerful than the original substances when halogen, Me, methoxy or alkylamine derivs. are used. Substitution with OH, HSO_3 or NH_2 lowers the disinfecting power. Addition of another oxy-Hg group increases the antiseptic power. F. C. KOCH.

The Action of Formaldehyde and Salicylic Acid on the Formation of Botulinus Toxin. R. H. SALTET AND J. ZEEHANDELAAR. *Pharm. Weekblad*, 48, 1337–40.—To active culture of *B. botulinus*, grown in media containing 4.8% Na_2CO_3, varying amts.

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of HCHO, or Na salicylate were added. 1–10,000 of HCHO prevented growth as did 1–2500 salicylate. [Too few expts. Abstr.] V. E. HENDERSON.

Nitrogen Nourishment of Aspergillus niger. (Preliminary Notice.) W. BRENNER. *Ber. botan. ges.*, 29, 479–83. H. A. SPOEHR.

Formation of Fumaric Acid by means of Molds. FELIX EHRLICH. Univ. Breslau. *Ber.*, 44, 3737–42.—Fumaric acid is produced by growing *Rhizopus nigricans* (Mucor stolonifer) in nutrient solns. containing excess of glucose, or fructose. The acid is not formed if glycerol or alc. be used instead of the sugar. The nature of the nitrogenous nutrient is without effect on the formation of acid. This is the first observed instance of the formation of an unsatd. compd. from sugar, by microörganisms. J. BISHOP TINGLE.

Protein Synthesis in the Lower Plants. K. PUREVICH. Univ. Kiev. *Biochem. Z.*, 38, 1–13.—*Aspergillus niger* was grown in artificial media which differed only in the form in which the N was provided. The ratio of the wt. of CO_2 excreted to the wt. of the dried fungus formed was taken as an index of the amt. of energy required to synthesize the same amt. of protein from the different forms of N. The ratio was smallest in media containing amino acids and NH_2 derivs., which therefore appear to be most easily synthesized into protein. Introduction of a Me group makes a substance more readily available, while Ph has the opposit effect. Me-urea is one of the most easily synthesized substances, while Ph-urea was the most difficult to synthesize. Peptone and egg albumin belonged to the more difficultly synthesized class. Ph-alanine, probably because of the influence of its Ph group, requires much more energy for its utilization than the other amino acids. The above results were obtained with dextrose as the source of C. When similar series were run with succinic acid, malic acid, and tartaric acid as C sources, the amt. of CO_2 evolved in the growth of a g. of mycelium was increased, but the comparative effects of the different N foods remained practically the same. D. D. VAN SLYKE.

Urinary Antiseptics: An Experimental Investigation. A. R. JORDAN. *Proc. Roy. Soc. Med., Pharm. Sec.*, 5, 26–42; cf. *C. A.*, 5, 1628.—Santalol salicylate has a feebler action than sandal-wood oil. In both BzOH and salicylic acid there is an increase in antiseptic power in the highly acid urins which is greater than can be accounted for by the increase in acidity alone. This is presumably due to the salicylic or hippuric acids. P. J. H.

Fermentability of Dextrins by Yeasts and Mold Fungi (LINDNER, MOHR). 16.

D. BOTANY.

CARL L. ALSBERG.

The Action of the Osmotic Pressure of Nutrient Media on the Form and Structure of Plants. J. BEAUVERIE. *Rev. gen. bot.*, 23, 212–9; *Expt. Sta. Record*, 25, 730.—B. gives the results of expts. on growing *Aspergillus*, *Phaseolus*, *Pisum*, *Lupinus*, *Zea*, and *Triticum* in media of various conc. with special reference to the modification in structure induced by the osmotic pressure of the nutrient media in which the plants were grown. J. J. M.

The Relation of Transpiration to the Water Content of Leaves in the Ocotillo. F. E. LLOYD. *Science*, 33, 191; *Expt. Sta. Record*, 25, 124. J. J. M.

Respiration in Air, in Nitrogen, and in Hydrogen. B. M. DUGGAR AND G. R. HILL, JR. *Science*, 33, 261; *Expt. Sta. Record*, 25, 124.—A brief account of expts. relating to the rate, continuance, and decline of anaerobic respiration or CO_2 production in N and H as compared with aerobic respiration under otherwise similar conditions. The plant materials used were slices of sugar beet and germinating seed. J. J. M.

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Light as a Formative Factor in the Habit of Growth of Asparagus plumosus. F. C. NEWCOMB. *Science*, **33**, 190–1; *Expt. Sta. Record*, **25**, 124.—The shoots of this plant grow erect for a time, and then turn their tips to the horizontal position. This bending is geotropic, but it is greatly influenced by the presence of light. Where shoots were so covered as to exclude the light the bending was delayed, and where subterranean buds were covered and caused to grow without ever being in the light the horizontal bend was never complete, but there were nutations through an arc of 20–50°.

J. J. M.

The Water Supply and the Osmotic Pressure Conditions of Desert Plants. H. FITTING. *Z. Bot.*, **3**, 209–75; *Expt. Sta. Record*, **25**, 430.—An extended investigation of the means by which desert plants obtain their water, special attention being given to the water-absorbing power of certain desert species as indicated by their intensified osmotic pressure. J. J. M.

The Effect of Light and Changes in Temperature on the Germination of Seeds and the Influence of the Water Content of Seeds in this Connection. L. PICKHOLZ. *Z. landw. Vers. Osterr.*, **14**, 124–51; *Expt. Sta. Record*, **25**, 431.—The seeds of *Poa pratensis* germinated normally in the dark only when heated for a time, but when the heat was applied constantly at either 20 or 28°, normal germination did not take place. The influence of direct sunlight was mainly due to the heat rays or to the light rays transformed into heat. In general the water content of the seed was in inverse proportion to the % of germination. In most cases when water was driven off the germination of the seed was benefitted, and an addition of water in most cases proved unfavorable.

J. J. M.

Amyloclastic Secretory Capacities of the Embryo and Aleurone Layer of Hordeum. I. F. STOWARD. *Ann. Bot. London*, **25**, 799–841; *Expt. Sta. Record*, **25**, 730.—Both the embryo and the aleurone layer possess an amyloclastic secretory capacity, but the magnitude of the aleurone layer capacity is much the greater. The endosperm by virtue of the secretory functions of the aleurone layer, was found to be capable of true autodepletion. J. J. M.

The Movements of the Metabolic Products of the Leaf through Uninjured, Chloroformed, and Plasmolyzed Petioles. N. T. DELEANO. *Jahrb. Wiss. Bot. Pringsheim*, **49**, 129–86; *Expt. Sta. Record*, **25**, 523.—A study of the time necessary for the complete disappearance from the leaf tissues of the primary starch formed by photosynthesis, and of the route of the unused foodstuffs in their journey through the leaf stem or petiole, as indicated by expts. with uninjured, chloroformed, scalded, and plasmolyzed petioles. In uninjured leaves the starch entirely disappeared in 33–46 hrs., and not only carbohydrates but other metabolic products passed out of the leaves, the carbohydrates being 1.06% of the fresh substance and the non-carbohydrates 1.63%. The bulk of the metabolic products usually passed through the central fibrovascular system of the petioles. J. J. M.

Assimilation of Free Atmospheric Nitrogen in Higher Plants. EVA MAMELI AND GINO POLLACCI. Univ. Pisa. *Atti accad. Lincei*, **20**, I, 680–7; cf. *Ibid.*, **19**, 501.—Seeds of *Raphanus sativus*, *Acer negundo*, *Cucurbita pepo*, *Polygonum fagopyrum* and *Solanum nigrum*, grown in a sterilized nutritive medium, either free from N or containing a known amt. of it, and in air freed from NH_3, nitrite, nitrate and org. N, assimilated N from the air; the greater the amt. of combined N in the nutritive soln., the smaller was the amt. of free N assimilated from the air. CHAS. A. ROUILLER.

The Presence of Saponarin in the Liverwort Madotheka platyphylla. HANS MOLISCH. *Ber. botan. Ges.*, **29**, 486–91.—Saponarin, a glucoside, $C_{21}H_{24}O_{12}$, which gives a blue color with the I-KI reagent was formerly thought to be sol. starch within

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the cell. Of 36 liverworts examined, *Madotheka platyphylla*, was the only one containing saponarin. H. A. SPOEHR.

The Significance of Water in the Life of Cultivated Plants. C. v. SEELHORST. *J. Landw.*, 59, 259–91.—The amt. of water at the disposal of the plant is of great influence on the constituents of its dry substance. The amt. of water used in the production of dry material is dependent not only on the variety of plant and the water at the disposal of the plant but also on the amt. of nutrient substances in the water. A bibliography is given. M. X. SULLIVAN.

The Green and Yellow Pigments of the Florideae. HARALD KYLIN. Univ. Upsala. *Z. physiol. Chem.*, 74, 105–22; cf. *C. A.*, 5, 1110.—The green pigment of the Florideae is a Mg compd. and probably identical with the chlorophyll of higher plants; the author believes it to be not in chem. combination with the phycoerythrin. Carotin can be detected in F. by the KOH method of Molisch. From *Ceramium rubrum* were extd., besides carotin, 2 other yellow pigments—zanthophyll and a substance closely related but sol. in petroleum ether. The last is perhaps derived from impurities (diatoms, etc.). The literature of the subject is fully discussed. A. HUNTER.

Assimilation of Nitrogen by Rice (KELLEY). 15. Influence of Common Salt upon the Germination of Beet Seed (VASILIEV, POMASKII). 28.

E. NUTRITION.

NORMAL.

P. B. HAWK.

Studies in Nutrition. LAFAYETTE B. MENDEL AND MORRIS S. FINE. Yale Univ. **I. The Utilization of the Proteins of Wheat.** *J. Biol. Chem.*, 10, 303–25. **II. The Utilization of the Proteins of Barley.** *Ibid.*, 339–43. **III. The Utilization of the Proteins of Corn.** *Ibid.*, 10, 345–52. **IV. The Utilization of the Proteins of the Legumes.** *Ibid.*, 10, 433–58.—An interesting theoretical and bibliographical discussion introduces this series of studies. The experimental work was performed on man and dogs, specific preps. or pure proteins being fed, and the N retention detd. In planning the expts. and in interpreting results 2 factors were chiefly considered, (1) the availability of the products existing more or less in their native condition, and (2) the utilization of the specific proteins themselves. Of the wheat proteins, ("glidine") and gluten and gliadin and glutenin are as horoughly utilized as the N components of fresh meat. In the study of the barley protein a crude protein was used, prepared from barley flour. In analyzing this material it was found that although starch grains were practically absent in the final product, yet hydrolysis with acid yielded a high % of reducing substance. This result suggests that the values obtained ordinarily for starch by acid hydrolysis cannot be relied upon, since other substances (as hemicelluloses) may be present which yield reducing substances upon hydrolysis. Allowing for the crude fiber and hemicellulose contained in the barley protein used, it is concluded that under favorable conditions, barley protein, like that of the wheat, would be almost perfectly digested. In the study of corn proteins, corn gluten containing 7.6% N was used. These partially purified proteins from corn are somewhat less completely utilized than meat, though this is probably due in great part to the cell residues remaining in the product employed. In the expts. on legume proteins, 5 products were employed, *viz.*, (1) soy bean, (2) the ordinary white bean of commerce, (3) crude bean protein, from which much of the starch had been removed, (4) phaseolin, and (5) pea globulin. Results showed that the legume proteins are less well utilized than the other vegetable proteins reported upon, though this statement must be accepted with some reservations until further work with pure proteins from legumes has been carried out, as well as studies upon the influence of certain indigestible materials upon readily digested substances such as meat. S. R. BENEDICT.

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The Influence of some Foodstuffs on Gastric Secretion. F. C. MOORE AND H. E. ALLANSON. London. *Proc. Roy. Soc. Med., Med. Sec.*, 5, 19–25.—H_2O, tea, coffee, cocoa, milk, albumin-water, meat exts. and Et(OH) were investigated under conditions which are not clearly stated and the numerous factors accompanying these seem to be largely uncontrolled. P. J. HANZLIK.

Chemical and Energy Exchange in Sleeping Children. J. HOWLAND. Physiol. Dept., Cornell Univ., New York. *Z. physiol. Chem.*, 74, 1–12; cf. *C. A.*, 5, 2882.—H. reports expts. on 4 sleeping children in a specially constructed respiration calorimeter of the Atwater-Rosa-Benedict type. The figures give for each child the age, wt in kg., av. heat production in cal. per sq. m. per day, and av. CO_2 excretion in g. per sq. m. per hr.: (1) 3 months, 4.77, 952, 14.6; the diet contained 2.98 g. N; with 5.12 g. N, heat production was 1050, an increase of 10%; it was 961 after 18 hrs. hunger, and 1130 when the child was awake and crying; (2) 7 months, 4.32, 1097, 16.6; increase of food N from 3.58 to 7.85 g. caused heat production to rize to 1383 (26%); (3) 6 months, 3.05, 737, 12.97; (4) 8 yrs., 6.60, 733, 11.1. The first 2 were healthy children, the others abnormally emaciated. The differences between (1) and (2) are perhaps to be attributed to inaccuracy of the ordinary formula for calc. body surface. A. HUNTER.

The Biological Significance of Casein Phosphorus for the Growing Organism. ALEX. LIPSCHÜTZ. Bonn. *Arch. ges. Physiol.*, 143, 99–108.—In a discussion of the problem whether the growing organism needs both inorganic and organic P a few expts. on dogs fed on a normal mixed P diet and on a conjugated P diet (casein and rice, sugar, fat and salts) indicated that the growing organism can satisfy its needs as well on a purely organic P diet as on a mixed diet. The organism must cleave inorganic P from the casein mol. for the use of its growing skeleton. W. A. J.

Food and Feeding. R. SAUNDBY. *Brit. Med. J.*, 1911, 1218–21.—Various dietary systems are discussed, and a summary of data given. WM. P. GARRETY.

The Feeding of Necessitous Children. D. FORBES AND J. LAMBERT. *Lancet*, 1911, II, 239–40.—Summary of a report. When properly fed, a previously underfed child shows the effect first in gain in height. WM. P. GARRETY.

The Metabolism of Fruit Acids in Warm Weather. B. F. DUCKWALL. *Canner and Dried Fruit Packer*, 33, 38–40.—Metabolism of fruit acids and other related topics are discussed. WM. P. GARRETY.

Dietetic Value of the So-called "Standard Bread." A. SMETHAM. *Roy. Lancashire Agr. Soc. J.*, 1911, 19–38.—Whole wheat bread was not found superior to other kinds. The need of Ca for combination with P_2O_5 is discussed. W. P. G.

Formation and Cleavage of Protein in the Human Body. T. PANZER. *Schr. Ver. Naturw. Kenntnisse Wien*, 51, 111–40.—This is a summary of previous investigations. WM. P. GARRETY.

Diet in India. B. N. GHOSH. *J. Roy. Inst. Pub. Health*, 19, 293–9; *Diet Hyg. Gaz.*, 27, 470–5; *Expt. Sta. Record*, 25, 569.—In connection with a critical discussion of McCay's work (*E. S. R.*, 25, 167), G. suggests dietaries for natives and for Europeans, and especially recommends the use of milk products in the native diet. J. J. M.

Feeding Experiments with Cows and Calves. J. MICHELS. N. Carolina Sta., *Bull.* 89–97; *Expt. Sta. Record*, 25, 777.—Expts. were undertaken to det. the relative efficiency of narrow and medium wide rations for milk production. J. J. M.

The Influence of Speed and Burden on the Energy Consumed in Walking. ERNST BREZINA AND WALTHER KOLMER. Vienna. *Biochem. Z.*, 38, 129–53.—The energy consumption of a man walking on a level was measured by the gas exchange. When

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the subject bore a burden not >21 kg. wt., the energy consumed in moving 1 kg. of wt., 1 m. was independent of the speed, if the latter did not exceed 85 m. per min. At greater speed the energy consumed per kg. per m. rose rapidly. Burdens up to 21 kg. were borne with equal or greater efficiency than the body wt. D. D. VAN SLYKE.

Action of Beer Yeast on Peptic Digestion. GIOVANNI PICCOLI. Univ. Bologna. *Arch. farm. sper.*, 12, 505–32.—Yeast has a favorable influence on peptic digestion. This influence is negligible for amts. as small as 0.005%, but is appreciable up to 5.0%. The max. effect was obtained with 0.25%. Only a small proportion of the yeast is destroyed by 7 hrs. digestion, and this loss is more than compensated by the development of new cells. A. W. DOX.

ABNORMAL.

Studies on the Protective Power of Bran in a Polished Rice Diet. L. BREAUDAT. *Bull. Soc. Path. Expt.*, 4, 498–502.—Rice bran, and a corresponding amt. of aq. ext. of rice bran were found to have a protective action in expts. with chickens on polyneuritis. This protection could not be ascribed to the additional N, nor to fat, cellulose, starch, etc. WM. P. GARRETY.

Digestion in Fever. J. B. NICHOLS. *Am. J. Med. Sci.*, 142, 93–5.—Reduction of digestion in fever averages only 5–10%. The relation of this conclusion to diet in fever is discussed. W. P. G.

The Feeding of Sick Infants with Human Milk. L. LANGSTEIN AND E. HOERDER. *Therap. Monatsh.*, 25, 701–11.—Review of the present knowledge of the role of the various constituents of human milk in infant nutrition. H. B. LEWIS.

The Influence of Forced Breathing and of Oxygen on Athletic Performance. H. M. VERNON AND H. R. STOLZ. Oxford Univ. *Quart. J. Exp. Physiol.*, 4, 243–8.—In running the av. time of the 1st run is slightly improved by deep breathing, while the time of the 2nd run is considerably improved. The time after O was not as good as that after air. In swimming under water, forced breathing of air seemed to improve the time, and O the distance. V. C. MYERS.

Magnesium and Calcium Metabolism in Chorea. J. AULDE. *N. Y. Med. Times*, 1911, March–April, 16; *Expt. Station Record*, 25, 370.—This contains data of interest in connection with the general question of mineral metabolism. The question of mineral matter in the diet, particularly with reference to the health of children, is taken up, as are other similar topics. J. J. M.

Excretion of Creatine and Creatinine under Pathological Conditions. BERNHART VAS. Budapest. *Biochem. Z.*, 38, 65–76.—Two cases of leucemia were investigated in order to ascertain whether any relation existed between the excretion of nuclein decomp. products (purines) and that of creatinine, None could be found. A case of creatinuria was noted in a boy in whom muscular atrophy had occurred as a result of the confinement of a leg in a plaster cast. D. D. VAN SLYKE.

The Physiology of Phosphorus Hunger in Growth. ALEX. LIPSCHÜTZ. Bonn. *Arch. ges. Physiol.*, 143, 91–8.—The normal growth of the organism during P hunger (*C. A.*, 4, 2529) may be explained in 2 ways: The small amts. of conjugated P in very low-P food may suffice for the needs of the soft parts or the organism may synthesize nucleoprotein from the inorganic phosphates of the skeleton. In either case the facts indicate that in hunger for an element essential in growth there occurs a struggle between the tissues. The growing organs and systems take all available P either from the food or bones and break the bonds set by Bunge's "law of the minimum" for the organism in P hunger. WALTER A. JACOBS.

Feeding Experiments with Isolated Food Substances. T. B. OSBORNE, L. B. MENDEL AND EDNA L. FERRY. Carnegie Inst., Washington, *Pub.* 156 (1911).—This

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is a progress report on the "possibilities of protein synthesis in animals and the conditions which this postulates; the significance of the availability, palatability, and physical texture of the food intake; the suggested role of various accessories—inorganic salts, lipoids, etc.; the distinctions between the nutritive demands during the period of growth and those of later adult life, are brought within the range of discussion." Expts. with white rats show the possibility of maintaining N equil. and health for long periods on a diet of a const. mixt. of pure foodstuffs, containing a single protein. "Numerous expts. are reported in which casein formed the sole nitrogeneous constituent of the dietary. In this connection it is shown that the make-up of the inorganic constituents of the diet exercizes an influential effect on the nutritive efficiency of the dietary. From the experience thus gained, a 'basal' ration was constructed on which rats were kept many months in good health. Some of these expts. in which the animals exhibited no noteworthy alterations in wt. and showed a good gain in N are, as far as the authors are aware, the most successful recorded attempts at artificial nutrition with a const. mixt. of pure foodstuffs, containing only a single protein. Satisfactory experience also followed the gradual complete substitution of the casein by other proteins, one animal continuing more than 217 days on a diet in which the sole protein was glutenin." WM. P. GARRETY.

Certain Fundamental Principles Relating to the Activity of Bacteria in the Intestinal Tract. A. I. KENDALL. *J. Med. Res.*, **25**, 117–87.—Collected data and expts. on infants suffering from bacillary dysentery, show that carbohydrates protect protein from bacterial action. Since the harmful effects of bacteria are mostly due to their action on protein, utilizable carbohydrates in the diet tend to prevent the production of putrefactive or toxic products. WM. P. GARRETY.

Excretion of Ammonia in Human Urin after the Administration of Urea and Sodium. N. JANNEY. Munich. *Z. physiol. Chem.*, **76**, 99–135.—The sole function of NH_3 in human urin is to neutralize the acids. After the administration of Na (as $NaHCO_3$) NH_3 disappears nearly entirely from the urin as its neutralizing function is no longer required. The reversible formation of urea from NH_3 could not be detected in the normal human body. 15 g. $NaHCO_3$ are sufficient to lower the NH_3 output to 1/3 and the urin acidity to 0 in adults on a mixed diet with normal protein metabolism. Administration of urea *per os* may either cause an increase of protein metabolism or a flushing out of nitrogenous substances. In cases of acute catarrhal icterus a true acidosis was often noted. G. M. MEYER.

The Passage of Colostrum into Milk, Especially the Behavior of Nitrogenous Substances (Cow, Sheep and Mare). ST. ENGEL AND L. DENNEMARK. Düsseldorf. *Z. physiol. Chem.*, **76**, 148–58.—In condition of milk fever the partition of protein substances in milk remains for weeks as in colostrum. The colostrum of sheep behaves very much like that of the cow; the colostrum properties are, however, not so accentuated. Mare colostrum is richer in casein than the milk and the change to the conc. as existing in milk takes place gradually. The most decided change in colostrum takes place on the 1st or 2nd day, colostrum of the diseased cow excepted. The acidity of colostrum in all species in markedly higher than that of the milk. G. M. M.

The Influence of Adrenaline on the Gas Exchange. PAUL HARL. Univ. Budapest. *Biochem. Z.*, **38**, 23–45.—Adrenaline administered to curarized dogs causes a marked decrease of the O consumption and a smaller decrease in the CO_2 production. The net result is an increase in the respiratory quotient, which indicates a relatively increased share of the carbohydrates in the metabolism. This, as well as the adrenaline hyperglucemia, is consistent with the theory that adrenaline causes an increased "mobilization" of sugar, and consequently an increased combustion of carbohydrates.

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The same lengths of time are required for adrenaline to show its effects on the carbohydrate metabolism as on the blood pressure. D. D. VAN SLYKE.

F. PHYSIOLOGY.

ANDREW HUNTER.

The Extractives of Muscle. XII. The Constitution of Carnosine. V. GULEVICH. Univ. Moskow. *Z. physiol. Chem.*, 74, 434–446.—A quant. study of the products of the hydrolysis of carnosine, obtained by heating in a sealed tube with baryta for 5 ½ hrs. at 130–40°. There were obtained: NH_3 = 4.4% of the N; histidine = 71.3%; and the third product, from earlier expts. supposed to be alanine, was shown to be unlike *dl*-alanine, but similar to β-alanine (synthetically prepared) in m. p., cryst. structure, etc. Analysis gave the formula, $C_3H_7NO_2$ and the compd. was inactive. The NH_3 is probably due to secondary decomp., and the histidine and alanine are probably given on hydrolysis in the proportion of 3 to 1. The β-alanine is of special interest, since β-compds. are exceptional in substances obtained from organisms; it may not be so contained in the organism and a study of this point is in progress.

C. C. BENSON.

Refractometric Examination of the Blood. GEORG SCHWENKER. Kiel. *Folia serol.*, 7, 1029–52.—For exam., serum must be clear and free of hemoglobin, to eliminate possible error by the refractometric method. During rest the conc. of the sera sinks rapidly at first, but reaches a level of constant conc. in about ½ hr. Serum from different parts of the body (ear, finger, lip) agree well in conc. Capillary blood and that obtained by treating the part with hot air have a higher conc. Capillary and venous blood are similar in conc. (at body rest), the latter at times being slightly higher. Arterial and venous blood are similar during rest. CO_2 increases the conc. of serum. Venous congestion increases serum conc., this depending only partly upon CO_2 increase and probably mainly upon withdrawal of water by the tissues. After restoration of the circulation the venous serum is of lower conc. than that of the capillaries, apparently due to passage of water from the tissues into the serum.

H. J. CORPER.

Presence of Erepsin in the Organs and its Distribution in the Mucosa of the Alimentary Tract. GIUSEPPE AMANTEA. Univ. Rome. *Arch. farm. sper.*, 12, 562–71; cf. *C. A.*, 3, 359.—By means of Sörensen's method, the presence of erepsin was detected in the intestinal mucosa, kidney, spleen, liver, lung, muscles, brain and blood serum of birds, reptils and amphibia. Erepsin occurs the entire length of the digestive tract, the greatest amt. being in the small intestin. A. W. DOX.

The Bile of the Hippopotamus. OLOF HAMMARSTEN. *Z. physiol. Chem.*, 74, 123–41.—The bile of the hippopotamus does not give Gmelin's reaction; it contains at least 2 pigments, giving together a spectrum similar to that of cholehematin. Of the total solids 10.9% are salts insol. in alc., chiefly NaCl. It is poor in phosphatides and ether-sol. material, the latter mainly olein. Cholesterol and jecorin are absent. Of the organic S 6.4% occurs as ethereal sulfate; the remainder corresponded to a taurocholate content = 28.89% of the total bile salts. Ordinary cholic acid is present in small amt., chiefly as taurocholate. The glycocholate fraction contained a very small amt. of glycocholeinic acid (?), but its principal constituent was a new bile acid, resembling α-hyoglycocholic, but having $[\alpha]_D$ 12–3°, and 1.2–1.3% S; the S was not due to contamination with taurocholic acid, and was not removed by an elaborate purification process. A. H.

The Fat of Colostrum. ST. ENGEL AND A. BODE. Düsseldorf. *Z. physiol. Chem.*, 74, 169–74.—The paper records detns. of the I, sapon., Reichert-Meissl, and Polenske nos. of the fat from the mammary secretion of 4 cows and 1 goat during the early days

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of lactation. These show that the colostral fat of the cow has already the distinctive characters of milk fat, although in less prominent degree. The transition is, in general, gradual; only the volatil fat acids increase suddenly between the 1st and 2nd days. The goat's colostral fat differs less from milk fat than the cow's. A. H.

The Discovery of Choline in Ox Brain. MAX KAUFFMANN. Halle. *Z. physiol. Chem.*, 74, 175–8.—Fresh ox brains contain no free choline. A. HUNTER.

The Influence of Adsorbing Substances on Gastric Juice. L. LICHTWITZ AND E. W. GREEF. Med. Univ.-klin., Göttingen. *Therap. Monatsh.*, 25, 721–4.—Kaolin and neutralon (Al silicate) did not adsorb HCl of physiol. strength as well as did blood charcoal or Bi subnitrate. Blood charcoal and neutralon adsorbed the pepsin from a conc. soln. almost completely. Kaolin and Bi subnitrate adsorbed only 42 and 65.4% from neutral conc. soln., but in a reaction of 0.25 *N* H^+ ion conc. the adsorption was greatly increased. The effect of these adsorbents in the stomach was studied by introducing them with a test meal. Analyses of the stomach contents showed a diminished acidity and pepsin content, most marked with blood charcoal. H. B. LEWIS.

Sulfur in Wool Bound in Sulfitic Form. H. STRUNK AND H. PRIESS. Berlin. *Z. physiol. Chem.*, 76, 136–44.—The observations of Raikov that wool kept in contact with sirupy H_3PO_4 gives rize to small amts. of SO_2 were confirmed. The quantity of SO_2 obtained (0.0064 from 300 g. wool) was far too small to permit the conclusion that a portion of the S in the keratin mol. is bound to O in the sulfitic form. It was found that dry wool has a strong affinity for H_2S which may be readily oxidized to H_2SO_3 and H_2SO_4. This would account for some of the contradictory results. The presence of minimal quantities of H_2SO_4 in natural wool might, therefore, be readily accounted for. G. M. MEYER.

Nitrogen and Sulfur Content of Human Blood. KANJI KOJO. Univ. Berlin. *Z. physiol. Chem.*, 76, 170–2.—Normal blood obtained from 2 subjects during an operation for uterin trouble gave an av. value for N = 3.806% (by vol.), S = 0.2027%. G. M. M.

Physiology of Blood Sugar. IV. Carbohydrates of the Red Blood Cells. E. FRANK AND A. BRETSCHNEIDER. Wiesbaden. *Z. physiol. Chem.*, 76, 226–34.—Erythrocytes of rabbits contain glucose; the quantities are, however, variable and may be greater or less than that contained in the plasma. Both plasma and corpuscles contain a carbohydrate complex which after b. with dil. acid is converted into a fermentable carbohydrate. The erythrocytes are capable of removing some of the carbohydrate of the surrounding plasma. G. M. M.

Distribution of Reducing Substances in the Blood. IVAR BANG. *Biochem. Z.*, 38, 166–7.—B. maintains that Michaelis and Rona (*C. A.*, 6, 389) have not proved that the blood corpuscles contain part of the blood sugar. D. D. VAN SLYKE.

Chemistry of the Cell Granula. Composition of the Eosinophile Granula of the Bone Marrow of the Horse. EUGEN PETRY. Graz. *Biochem. Z.*, 38, 92–112.—The eosinophile substance of the marrow appears identical with that of the blood leucocytes. It was freed from hematin with H_2O-ether and from ordinary proteins with trypsin. The substance itself gives the protein reactions, but is very resistant to the action of trypsin, and is insol. It apparently belongs to the same class of proteins as keratin and elastin. The ash contains 6–11% of Fe, which is believed to exist in the granula in chem. combination with the eosinophile protein. The granula are believed to be cell excretions. D. D. VAN SLYKE.

Individual Variations in the Red Blood Cells. LUDWIG DIENES. Univ. Budapest. *Biochem. Z.*, 38, 159–60.—D. reaffirms his conclusions against the objections of Rusznyak (cf. Dienes, *C. A.*, 6, 636; Rusznyak, *C. A.*, 6, 637). D. D. VAN SLYKE.

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G. PATHOLOGY.

H. GIDEON WELLS.

A New Immunity Procedure against Trypanosome Infections. CLAUS SCHILLING. Berlin. *Deut. med. Wochschr.*, 38, 13-4.—S. was able to kill trypanosomes (*T. nagana*) *in vitro* by means of a 1 : 2000 soln. of "Brechweinstein" (tartar emetic) and this soln. injected into rats produces in them immune bodies. The serum of these rats is protective in mice. In dogs these immune bodies are also formed and can be demonstrated by protective inoculation in mice or by the Bordet-Gengou complement-binding power. The horse also produces antibodies after intraperitoneal injection of "Antigen Tartarus stibiatus." H. J. CORPER.

The Fixation of Soluble Antigen by the Tissues. R. T. PETTIT AND A. J. CARLSON. Univ. Chicago. *J. Infect. Dis.*, 10, 43-7.—Using egg albumin and goat serum as antigen, the authors found that it is retained in the tissues (probably by chem. fixation), thus eliminating the possibility that the results obtained by Hektoen and Carlson with foreign corpuscles were due to mechanical sepn. or phagocytosis. H. J. C.

The Production of Anaphylatoxic Substances by Autolysis of Bacteria and their Relations to Endotoxins. E. C. ROSENOW. Mem. Inst. for Infect. Dis. *J. Infect. Dis.*, 10, 113-28.—The NaCl soln. in which *Strept. pyog*, *Strept. mucosus*, *meningococcus*, *gonococcus*, *B. typhosus*, *B. coli* and the *spirillum of Metchnikoff* are suspended becomes very toxic at a certain stage of autolysis. The acutely toxic substance appears at a time proportionate directly to the activity of the autolytic ferment. *Staph. aureus* which did not autolyze to any extent gave no toxic effect in the NaCl soln., but when treated with leucocytes or serum the toxic substance was brought into soln. Extracts of *B. pyocyaneus*, while toxic, never produced symptoms resembling anaphylaxis. Formalin titration and the polariscope give evidence that the anaphylatoxic substance is in all probability an early cleavage product of the bacteria. The symptoms and post-mortem appearances are identical with those obtained by a second protein injection in sensitized pigs and the acute death is an asphyxia due to bronchial spasm. R. concludes that intoxication during infections with bacteria which do not produce sol. toxins is probably produced by 2 distinct mechanisms: the production by the growth of the bacteria of albuminous toxic cleavage products from the surrounding fluids, and similar toxic material from their own disintegration. H. J. C.

A Reply to Schenk's Findings on the Hydrolyzing Action of Anaphylactic Sera. H. PFEIFFER. *Wien klin. Wochschr.*, 1911, No. 16, 573; through *Centr. Bakt. Parasitenk. I Abt. Ref.*, 50, 544.—Schenk's results can be explained by avoidable errors in removing coagulable proteins. F. C. K.

Anaphylaxis toward Tuberculin. A. SLATINEANU AND D. DANIELOPULU. *Ann. de Biol. T.*, 1, 90 (1911); through *Centr. Bakt. Parasitenk., I Abt. Ref.*, 50, 545.—Animals may be sensitized toward tuberculin or *B. tuberculosis* by subcutaneous or intravenous injection of tuberculin. The sensitizing is not as marked as when horse serum is used. F. C. K.

The Thermostability of Fixed Antibodies. GEORG BESSAU. Breslau. *Centr. Bakt. Parasitenk., I Abt. Ref.*, 60, 363-85.—Antibodies united with antigen are destroyed by heating for a short time (20 min. or more) at 80°. The cholera bacteriolysins are destroyed in 10-20 min. to the same extent whether combined or not. F. C. K.

The Nature of Antianaphylaxis. GEORG BESSAU. Breslau. *Centr. Bakt. Parasitenk., I Abt. Orig.*, 60, 637-51.—Guinea pigs sensitized with horse and ox sera and which have subsequently undergone an anaphylactic reaction brought about by ox serum, after recovery show the same protection toward an injection of horse

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serum as to second injection of ox serum. Similarly, recovery from an anaphylactic shock due to horse serum renders the animal less sensitive to an injection 24 hrs. later of anaphylactic toxin from typhoid bacillus. Antianaphylaxis is not an absorption of antibody; it is a reaction condition brought about by anaphylactic poisons, which renders the organism more resistant against anaphylactic toxins. F. C. K.

Complement Fixation in Varioloia and Variola Vera. D. KRYLOV. *Centr. Bakt. Parasitenk., I Abt. Orig.*, 60, 651–71.—The pustule contents can be used successfully as antigen, but the lymph, organs and blood serum of small-pox patients are of no value as sources of antigen. F. C. K.

Experiments on the Mechanism of Antitoxin Action. E. VON GRAFF AND V. MENSCHIKOFF. Vienna. *Centr. Bakt. Parasitenk., I Abt. Orig.*, 61, 226–31.—Suspensions of human liver cells digested 2 hrs. with tetanus antiserum (horse) when centrifuged and extracted with salt soln. gave a negative precipitin reaction. After digestion for 28 hrs. the liver cells take up the toxin from tetanus toxin solns. Such toxin-containing liver cells can be detoxicated by digesting for ½ to 1 hr. with 10% antitoxin solns. F. C. K.

The Activation of Cobra Venom by Organ Extracts. J. v. ZUBRZYCKI. Vienna. *Centr. Bakt. Parasitenk., I Abt. Orig.*, 61, 232–7.—Liver, lung, adrenal and heart exts. in physiological salt soln. readily activate cobra venom toward horse erythrocytes. Kidney, spleen and brain exts. are less activating. Fat, sinew, aorta and dura mater exts. show no such action. Various pathological conditions in the human organs do not materially alter these relations. F. C. K.

The Relations between Opsonic Complement and Antibody in Anaphylaxis. ST. BÄCHER AND T. WAKUSHIMA. Vienna. *Centr. Bakt. Parasitenk., I Abt. Orig.*, 61, 238–47.—Guinea pigs sensitized by subcutaneous injection of diphtheria horse serum when reinjected intravenously with normal horse serum show a lowering in the opsonin content and phagocytic power. Guinea pigs sensitized in the same way and then immunized against typhoid bacillus, when reinjected with normal horse serum show a lowering in the opsonic power, but no change in the agglutination power. The normal opsonin present in dog serum is neutralized or rendered unavailable when the dog is injected with peptone. After each injection of peptone the opsonic index is lowered; it slowly returns to normal. F. C. K.

The Wassermann Reaction with Non-syphilitic Sera and Lecithin as Antigen. EZIO CALCATERRA. Genoa. *Centr. Bakt. Parasitenk., I Abt. Orig.*, 60, 319–23.—Each of 4 rabbits was treated with lung tissue ext. and with diplococci and gonococci alexins, resp. Two others were treated with 1% lecithin emulsions. The sera of the lung tissue and cocci-treated as well as of the control rabbits, reacted positively to the Wassermann test, using a 10% alc. ext. of guinea pig heart as antigen. The sera from the lecithin-injected animals reacted negatively. F. C. K.

The Presence of a Specific Precipitin in the Blood of Pellagra Patients. GUIDO TIZZONI. Bologna. *Centr. Bakt. Parasitenk., I Abt. Orig.*, 61, 403–7.—Cultures of *Streptobacillus pellagrae* from patients as well as from decayed corn show the precipitin reaction with the blood sera from pellagra patients. F. C. K.

The Cultivation of Tissues in Vitro as a Method for the Study of Cytotoxins. ROBERT A. LAMBERT AND FRED. M. HANES. Dept. Path., Coll. of P. and S., Columbia Univ. *J. Exp. Med.*, 14, 453–61.—The method of cultivating tissues outside the body offers an ideal technic for the demonstration and study of cytotoxins. Mouse sarcoma, which grows vigorously in the plasma of normal rats, shows little or no activity in the plasma of rats immunized by mouse sarcoma injections. Rat sarcoma, readily cultivated in the plasma of normal guinea pigs, either remains quite inactive, or presents

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a feeble growth in the plasma of guinea pigs previously treated with rat tissues. The inhibition of growth of cultures of rat and mouse sarcomata in plasma from animals of a foreign species immunized against these tissues, is due probably to the action of cytotoxins. WALTER A. JACOBS.

Salvarsan and Acute Anaphylaxis. JOHN AUER. Rockefeller Inst., N. Y. *J. Exp. Med.*, 14, 497–9.—Spaced injections of 0.1% salvarsan, the time intervals being 2 and 4 weeks and 5 mos., caused no acute anaphylaxis in guinea pigs and rabbits. Also repeated spaced injections of fairly large doses of salvarsan in 0.1% soln. caused no cumulative effects in rabbits. W. A. J.

The Elimination of Phenolsulfonephthalein in Various Experimental Lesions of the Kidney. A. B. EISENBREY. Univ. Penn. *J. Exp. Med.*, 14, 462–75.—The phenolsulfonephthalein test (Rowntree and Geraghty, *C. A.*, 4, 2506) proved satisfactory in estg. the functional activity of the kidney. The elimination of the test dye is decreased in so-called spontaneous nephritis and in experimental nephritis produced by K_2CRO_4, $UrO_2(NO_3)_2$, cantharidin, diphtheria toxin, and As and in those lesions caused by snake venom, hemolytic serum, prolonged renal anemia, and extensive reduction of the kidney substance. Its elimination is increased in the presence of the renal lesion caused by nephrotoxic immune serum, and for this discrepancy no explanation was found. W. A. J.

Urorosein and its Clinical Significance. M. WEISZ AND B. SMIECIUSZEWSKI. Vienna. *Wien. klin. Wochschr.*, 24, 1791–4.—The chromogen of urorosein was present normally in traces in the urin. An increased putrefaction, due to constipation, caused an increased elimination of urorosein. Carcinoma of the digestive tract with or without constipation caused increased urorosein elimination. The increased urorosein content of the urin and the various tryptophane tests for gastric carcinoma are both to be regarded as expressions of the same process, a pathologically altered protein decomp., due to carcinoma. H. B. LEWIS.

A Chemical Study of Saliva, in its Probable Relation to the Decay of Teeth. ALFRED P. LOTHROP AND WM. J. GIES. Columbia Univ. *J. Allied (Dental) Socs.*, 6, 65–92.—Comparative detns. of consistence, acidity, nitrite, thiocyanate, mucin, total solids and ash indicated that there is no discernible relation between the comp. of the saliva and the state of the teeth of the person secreting the saliva. Mucin is probably the salivary substance which is particularly influential in the development of local conditions favoring the onset of dental decay. The use of dil. vinegar or common fruit juices is suggested as an aid in the removal of mucinous masses (bacterial plaques) from the teeth. The saliva of a given individual varies greatly in comp. on any day or during any succession of days. Chemical analysis of saliva is inadequate for the detn. of the cause of dental disease of any type. A. P. LOTHROP.

Physiology of Anaphylactic Shock. J. SCHÜRER AND R. STRASMANN. Med. Klin., Heidelberg. *Z. Immunität.*, 12, 143–52.—Extirpation of the cerebrum has no effect on appearance of anaphylactic shock in rabbits and guinea pigs. Acute fatal reactions can occur after cutting the cervical cord or both vagi. Therefore, no evidence could be obtained for a central action of the anaphylactic poison. H. G. W.

Anaphylatoxin from Non-specific Precipitates. L. LATTES. Univ. Turin. *Z. Immunität.*, 12, 153–63.—Anaphylatoxin can be prepared from non-sp. ppts., and hence, sp. and non-sp. ppts. cannot be differentiated by formation of this poison. H. G. W.

Salt Fever and Treatment of Syphilis with Salvarsan. J. MCINTOSH, P. FILDES AND H. DEARDEN. London Hosp. *Z. Immunität.*, 12, 164–82.—The authors find

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that so-called "salt fever" following injection of physiol. NaCl soln. depends upon presence of large nos. of bacteria in the soln., in spite of the killing of these bacteria by heat. When the bacteria are removed from the soln., salvarsan injections are not followed by fever except in acute cases when large amts. of endotoxin are liberated. H. G. W.

Effect of Blood Serum on Oxidation Processes in Bacteria. R. WIESEL. Heidelberg. *Z. Immunität.*, 12, 194–9.—Oxidation processes are greatly reduced, as measured by abstraction of O from hemoglobin. Effect of sera varies with species and individuals furnishing them. There seems to be a parellelism between bactericidal power and inhibition of oxidation, and it may be possible to use this fact in measuring bactericidal power of serum. H. G. W.

Anaphylaxis and Atropine. JOHN AUER. Rockefeller Inst., New York. *Z. Immunität.*, 12, 235–40.—A. shows that the failure of Mita to prevent anaphylaxis with atropine depends upon inadequate dose of the atropine with large doses of serum. H. G. W.

Further Studies on Vibrio cholerae. On the Behavior of the Cholera Vibrios from the Arabian Epidemic of 1908 in Agglutination with Low Strength Serum. R. KRAUS, J. HAMMERSCHMIDT AND ZEKY ZIA. Vienna. *Centr. Bakt. Parasitenk. I Abt. Orig.*, 61, 207–18.—In general the biological behavior of cholera vibrios on agglutination with highly active serum shows no distinguishable differences. However, by means of low agglutinating horse serum the Kamaran cholera strain can be distinguished from the El Tor and other strains. F. C. KOCH.

The Action of Formalin on Tetanus and other Bacterial Toxins. M. VON EISLER AND E. LÖWENSTEIN. Vienna. *Centr. Bakt. Parasitenk. I Abt. Orig.*, 61, 271–88.—Tetanus toxin solns. containing 0.1–0.2% formalin, when exposed to the light from a $^1/_4$ amp. Nernst lamp, lose their toxicity in 2–3 weeks; this destruction takes place more rapidly in an atm. of O than of H; the light rays hasten the destruction. Such toxins still show toxicity, but require a long incubation period to manifest their actions. An antitoxic immunity may be brought about by such altered toxins. Dysentery toxin is only slightly affected and in this case the prolonged incubation period could not be shown. F. C. KOCH.

Studies on Endolysins. III. Inhibitory Action of Various Substances on the Bactericidal Action of Leucocyte Extracts. ALFRED PETTERSSON. Stockholm. *Centr. Bakt. Parasitenk. I Abt. Orig.*, 60, 286–97.—Studies on *B. subtilis*, *B. proteus*, and *B. typhi* show that various colloidal substances such as serum globulin, dextrin and colloidal silicic acid, may inhibit the bactericidal action of serum or of leucocyte ext. Egg albumin does not show this action. Lanolin, although strongly inhibitive when acting alone, is not so when mixed with serum. Kaolin and gelatin entirely inhibit the bactericidal action of blood serum on *B. subtilis* and *B. proteus*, but have no effect on the lysis of *B. typhi*. F. C. KOCH.

Note on Extirpation of the Thyroid Gland in Monkeys. J. HALPENNY AND J. A. GUNN. Univ. Manitoba, Winnipeg. *Quart. J. Exp. Physiol.*, 4, 237–41.—Expts. are reported of the removal of the thyroid and parathyroid glands in 8 monkeys. V. C. MYERS.

H. PHARMACOLOGY.

ALFRED N. RICHARDS.

Radium Emanation as a Diuretic. L. GRIN. Berlin. *Münch. med. Wochschr.*, 58, 2792–3.—A Ra drink cure acted as diuretic in one case of uremia and a case of arteriosclerosis and nephritis in which other remedies failed. H. J. CORPER.

The Toxicity of Salvarsan by Intravenous Administration in Dogs and Rabbits.

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MARTIN KOCHMANN. Univ. Greifswald. *Münch. med. Wochschr.*, 59, 18–9.—Salvarsan given intravenously to rabbits in 6-40 mg. doses per kg. body wt. causes an increase in body wt.; 50 mg. doses cause no change in body wt. but injure the kidneys (albumin in the urin); 100 mg. is the death dose, producing inflammatory lesions and hemorrhages in the intestins; 200 mg. kill without anatomical changes. In dogs, salvarsan is more toxic, 25–50 mg. producing albuminuria; 50–100 mg. producing anatomical changes. The lethal dose of salvarsan in rabbits is 34 mg. As, while that of K arsenite is 4.56–5.3 mg. As. H. J. C.

Experiments on the Neurotoxic Action of Salvarsan. KARL BECK. Univ. klin. f. Ohren, Nasen u. Kehlkopfkranke. *Münch. med. Wochschr.*, 59, 19–20.—No changes occur in the brain of mice injected intravenously with salvarsan. H. J. C.

The Physiological Action of Cytisine, the Active Alkaloid of Laburnum (Cytisus laburnum). H. H. DALE AND P. LAIDLAW. Wellcome Physiol. Lab., London. *J. Pharm. Exp. Therap.*, 3, 205–21.—The action of cytisine is qualitatively indistinguishable from that of nicotine. The parallelism which exists between the 2 substances is quite exact, although chemically they are not close relatives. Cytisine apparently has no therapeutic value. P. J. HANZLIK.

The Influence of Sodium Iodoxybenzoate and Sodium Cyanide upon an Allergic Reaction of Inflammatory Character. SAMUEL AMBERG AND J. H. MASON KNOX, JR. Johns Hopkins Univ., Baltimore. *J. Pharm. Exp. Therap.*, 3, 223–66.—The intensity of the intracutaneous reaction of a rabbit sensitized to horse serum is dependent on the amt. of serum used for the intracutaneous injection, a large dose diminishing the intensity of the reaction. This is also true for iodoxybenzoic acid; also when applied locally. Iodobenzoic acid, BzOH and NaCN have the opposit effect. Iodoxybenzoic acid and NaCN possibly do not influence the mechanism of the allergic reaction, but their influence is directed against the inflammatory process due to a product of allergic reaction. It is suggested that measures favoring oxidative processes in the tissues tend to inhibit inflammatory processes while measures interfering with oxidative processes have the opposit tendency. P. J. H.

Alcohol and Caffeine: A Study of Antagonism and Synergism. J. D. PILCHER. Pharm. Lab., Western Reserve Univ. Med. School, Cleveland. *J. Pharm. Exp. Therap.*, 3, 267–98.—The psychic effects, effect on reflexes, convulsions, fatality, heart rate, temp. and rate of respiration were studied on cats. When small doses of caffeine and of alc. are combined each drug produces qualitatively its ordinary effects. When large doses of the 2 drugs are combined, the effects of the stimulant drug tend to be reversed, resulting in greater depression. Certain practical deductions are made. P. J. H.

Physiological Studies in Anaphylaxis. IV. Reaction of the Cat toward Horse Serum. W. H. SCHULTZ. Pharm. Div. Hygienic Lab. Public Health and Marine Hosp. Serv. *J. Pharm. Exp. Therap.*, 3, 299–317.—Horse serum kills cats by its action upon the cardiopulmonary system and not by vasodilatation of the systemic blood vessels alone, the distension of the large abdominal and thoracic veins being for the most part passive. Large doses rapidly injected are more certainly fatal. P. J. H.

Two Crystallin Pharmacological Agents Obtained from the Tropical Toad, Bufo agua. J. ABEL AND D. J. MACHT. Pharmacol. Lab., Johns Hopkins Univ., Baltimore. *J. Pharm. Exp. Therap.*, 3, 319–77.—Two distinct physiologically active, cryst. principles were isolated. Chem. and physiologically one is identical with epinephrine; the crude venom contains nearly 7% of this. The other principle is named *bufogine*, ($C_{18}H_{24}O_4$), m. 217–8°, dextrorotatory (+11°), neutral. Its action on the heart, cardioinhibitory center and blood vessels simulates that of the members

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of the digitalis series. It does not appear to have a cumulative action and may be administered hypodermically. The toad, *Bufo agua*, is not immune to epinephrine, but is immune to bufagine. On the basis of its good keeping qualities, its chem. purity and the effects of bufogine, its therapeutic trial is urged. P. J. H.

The Action of Potato Tyrosinase on Adrenaline. F. RANSOM. London. *Proc. Roy. Soc. Med., Pharm. Sec.*, 5, 19–25.—Potato tyrosinase so alters adrenaline that both the power of causing rise of blood pressure and that of producing glucosuria are lost. R. suggests that the OH groups of the ring form one of the points which the tyrosinase attacks. The pressure and glucosuric powers of adrenaline are so situated in the adrenaline mol. that one may be lost and the other retained. These differences in action are brought out in subcutaneous and intravenous injections. P. J. H.

The Influence of Sulfur and Thiourea on the Elimination of Phenol. KENJI KOJO. Univ. Berlin. *Z. physiol. Chem.*, 76, 159–69.—The administration of thiourea and S (sulfidal, Fabrik v. Heyden) both cause an increased elimination of phenol. The S as sulfates in the urin was increased far more than the neutral S. Only small amts. of the S were utilized for the formation of phenolsulfonic acid. The results support the view that phenol is one of the intermediary products of normal metabolism and its formation is not due solely to putrefactive bacteria. G. M. MEYER.

The Role of Hypophysis in Nutrition. F. DUNCAN. *Presse méd. Paris*, 1911, 312–4; *Expt. Sta. Record*, 25, 369.—Expts. (with rabbits) are reported on the effects of hypophysis on nutrition, body temp., respiration, and other physiological factors. The administration of this material, produced, among other effects, rapid loss in wt., increased blood pressure, a lowered elimination of N and glucosuria. J. J. M.

Nitroglycerin as a Drug and Nitroglycerin Poisoning. ALFRED WEINBERG. Göttingen. *Z. ges. Schiess-Sprengstoffw.*, 6, 427–32, 449–52.—Nitroglycerin is used medicinally as spirit of glonoin, a 1% soln. in alc., also in the form of tablets containing 0.001 g. absorbed in cocoa-paste or other absorbent. Very small amts. of nitroglycerin taken internally or absorbed through the skin produce marked symptoms in most persons, although susceptibility to the drug varies and immunity may result from its const. use. Its action depends on a dilation of the blood capillaries, causing an acceleration of heart action to compensate for the reduced blood pressure. This is accompanied by intense headache of long duration, dizziness, nausea, etc. There is a formation of methemoglobin, reducing the O-carrying capacity of the blood, and sometimes a partial paralysis of the brain and spinal cord, delirium, etc. Similar symptoms are produced by amyl nitrite and by the alkali nitrates. It is considered that these effects are the result of a reduction of the nitrate to nitrite within the body. Nitrites are readily detected in the urin in cases of such poisoning. W. gives an excellent historical account of many investigations on the action of the drug, expts. on animals, fatal poisonings, etc. Rabbits, dogs and other small animals are less susceptible to nitroglycerin than human beings. As little as 1/2 drop of a 1% soln. may strongly affect a man, although in one instance drinking 1/2 glass of pure nitroglycerin resulted in no worse effects than a 3-day headache. Its medicinal use is confined to such cases where an abnormally high blood pressure exists, as in arteriosclerosis, Bright's disease, etc. C. G. STORM.

The Fate of the Stereoisomeric Lactic Acids in the Organism of the Normal Rabbit. JACOB PARNAS. Strassburg. *Biochem. Z.*, 38, 53–64.—The 3 optical isomers of lactic acid were injected subcutaneously into rabbits, and sought in the urin subsequently voided, the products being regained by ether extraction and identified as the Zn salts. After injection of 4.5 g. *l*-lactic acid, 2.17 g. were regained from the urin. After similar injection of the *d*-acid, only 0.1 g. was excreted. Injection of 9 g. of *dl*-acid resulted

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in the excretion of 0.2 g. of *l*-acid and 0.3 g. of *dl*-acid, the *d*-component being almost completely burned in the body. The *l*-acid, which is not burned in the body, is toxic in large doses. D. D. V. S.

The Quantities of Alcohol Excreted by the Mineral Organism under Various Conditions. II. The Influence of Muscle Work on the Excretion of Alcohol from the Lungs and in the Urin. W. VOLTZ AND AUGUST BAUDREXEL. Berlin. *Arch. ges. Physiol.*, **142**, 47–88; *C. A.*, **5**, 2282.—In all expts. the same 10–11 kg. dog received equal amts. of alc., 19.44 cc. of a 9.77 vol. % soln. (1.7–1.9 cc. per kg. wt.). The head was immediately covered with a specially constructed mask. As a result of increased respiration produced by running 8.429 km. in 1.5 hrs. on a treadmill the quantity of alc. excreted both in the breath and urin was 2.66 times that removed in other expts. During a working time of 1.5 hrs. and 1.5 hrs. rest (alternating in 5-min. periods) the amt. of alc. removed alone through the lungs was 6.02 times that for a 3-hr. rest expt. A 2-hr. run of 11.39 km. within 3 hrs. (1 hr. of 5-min. pauses) produced further increase of respiration with 3.37 times the alc. elimination in breath and urin removed during a 3-hr. rest expt. In the breath alone 9.8 times more was exhaled during work than during rest. When work started, 3–6 hrs. after the alc. was given (11.19 km. in 2 hrs. and 1 hr. of pauses), 5.38 times more was exhaled than during an equal period of rest. The no. of respirations during rest and work was proportional to the amts. of alc. removed in the breath and urin in each case. The alc. content of the urin during work was increased only 60–70% over that during rest. The large water consumption of the organism necessary to maintain heat regulation caused the relatively greater removal through the lungs. In spite of the relatively greater removal during work by far the greater portion of alc. is oxidized by the organism. During rest a total of 3.03% of the ingested alc. was removed unchanged. During work this rose to about 9.5%. Only under extraordinary conditions can the unavailable alc. exceed 15% of the intake. W. A. J.

Excretion of Indigo Blue in the Urin. PAUL SOMMERFELD. *Münch. med. Wochschr.*, **58**, 2793.—The urin of a 7 yr. old normal boy was dark green due to the indigo blue present; the reaction was slightly acid, other coloring matters and albumin being absent. $CHCl_3$ extracts the indigo blue, this solution giving the absorption spectra of indigo. Indoxyl was also present in the urin voided. H. J. C.

A Contribution to the Chemotherapy of Glucosuria. GEORG ROSENFELD. Breslau. *Ber. klin. Wochschr.*, **48**, 1313–7.—The lactone of α-glucoheptonic acid when given to starved dogs does not appear to be transformed into glycogen; 10 to 20% reappears in the urin. In phloridzin diabetic dogs excreting at least 15–25 g. glucose per day on the regular diet, the feeding of 8 g. per day of the lactone reduced the glucosuria to varying extents. The lactone is readily absorbed. Given in doses of 2–100 g. to diabetics the glucosuria was lowered. Acetonuria was not diminished. Respiration expts. on diabetics show that the respiratory quotient is increased from 0.65 to 0.68 on a vegetable diet to 0.719–0.778 1/2 hr. later, taking 20 g. of the lactone. F. C. KOCH.

The Influence of the Lactone of α-Glucoheptonic Acid on Diabetes Mellitus. F. PRINGSHEIM. II. Med. Abt. Allerheil. Hospit., Breslau. *Therap. Monatsh.*, **25**, 657–62.—The lactone of α-glucoheptonic acid in amts. up to 50 g. was tolerated by diabetics and was completely burned in amts. up to 30 g.; with daily doses of 40 g., small amts. of the unchanged lactone were recovered from the urin. A favorable influence on the glucosuria was observed in 5 out of 6 cases; cf. preceding abstr. H. B. LEWIS.

Effect of Salvarsan on the Wassermann Reaction in Normal Rabbits. G. EMANUEL. Charlottenburg. *Ber. klin. Wochschr.*, **48**, 2335–6.—In most cases the

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injection of salvarsan causes a reduction or a temporary loss of the Wassermann reaction in normal rabbits. The temporary reduction of a previously positive test in syphilitic man may not necessarily indicate a therapeutic action of salvarsan.

F. C. KOCH.

The Antagonistic Effects of Photodynamic Sensitizers on Ultraviolet Light. A. PERUTZ. Vienna. *Wien. klin. Wockschr.*, 25, 78–9.—Methylene blue had neither a retarding nor an accelerating effect on the sensitizing of the hematoporphyrin with ultraviolet light in rabbits fed with sulfonal. Eosin accelerated the sensitizing, while quinine sulfate whether applied internally or externally, acted antagonistically to the sensitization. H. B. L.

Plurality of Toxic Substances in Snake Venoms. A. F. COCA. Cornell Univ. Med. College, New York. *Z. Immunität.*, 12, 134–42.—The contention of Bang that cobra venom contains but a single toxic element is disproved by repeating the sepn. of hemotoxic and neurotoxic components according to the method of Kyes, using tadpoles as indicators of toxicity. The effect of cobra venom upon these animals is caused chiefly by the hemotoxic element, which acts also upon the epithelium of the gills and skin. Flexner's view of multiple sp. cellular toxins is not accepted. H. G. W.

Action of Intravenous Injections of Watery Extracts of Organs. LEO LOEB. St. Louis. *Z. Immunität.*, 12, 189–93.—When blood serum and tissue exts. are mixed and let stand for some time there results a marked reduction of the power of the exts. to cause coagulation of the blood. Heating to 56° for 30 min. destroys, to a large extent, the constituent which forms with serum a product inhibiting coagulation, and affects much less the coagulins. Heating to 60° decreases both components.

H. G. W.

Pharmacology of Sulfur and its Compounds (WILD). 17.

I. ZOOLOGY.

R. A. GORTNER.

The Catalase of Sea Urchin Eggs before and after Fertilization, with Especial Reference to the Relation of Catalase to Oxidation in General. SAMUEL AMBERG AND M. C. WINTERNITZ. Johns Hopkins Univ. *J. Biol. Chem.*, 10, 295–302.—The fertilization of sea urchin eggs, which leads to an increase of 4–6 times the cell oxidation, is not accompanied by any increase in the catalytic activity. S. R. BENEDICT.

The Shell of Chelone imbricata. HANS BUCHTALA. Med.-chem. Inst., Univ. Graz. *Z. physiol. Chem.*, 74, 212–20.—Air-dry tortoise shell contains 14.14% N and 1.50% S. The % distribution of N is humin 0.02, NH_3 3.04, monoamino 94.84, and diamino 3.09. On hydrolysis the following proportions of amino acids were isolated: Glycocoll, 19.36; alanine, 2.95; valine, 5.23; leucine, 3.26; phenylalanine, 1.08; tyrosine, 13.59; and cystine, 5.19%. The material offers a convenient source for the prep. of tyrosine. A. HUNTER.

Topography of Enzymes in the Alimentary Canal of Fishes. OSW. POLIMANTI. Naples. *Biochem. Z.*, 38, 113–28.—The method of Hamburger was used, bits of agar being allowed to lie on the walls of the canal several hrs. until they had absorbed the enzymes, after which they were emulsified in a soln. containing the substrate on which the action of the enzyme was tested. The fishes tested were *Scyllium catulus*, *Scyllium canicula*, *Box salpa*, and *Conger vulgaris*. Pepsin was found to be most abundant in that part of the stomach where the food lies the longest, *viz.*, the middle part in the first 3 fishes mentioned, and the sack-like end of the conger's stomach. The distribution of chymosin was the same as that of pepsin. Lipase in the first 3 fishes was most abundant in the cardiac end of the stomach, decreasing steadily towards the pyloric end. In the conger it was most abundant in the sack. No amylase or invertase could be

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found in the stomach. In the intestin the amt. of enterokinase was greatest in the duodenum and decreased towards the anus. The distribution of erepsin was just the opposit. D. D. VAN SLYKE.

12. FOODS.

W. D. BIGELOW.

Louis Grandeau. *Ann. sci. agron.*, [3] 6, 321–35.—Obituary. J. A. LE CLERC.

International Conference on Food Analysis, June, 1910. *Analyst*, 36, 536–9.—The set of rules adopted at the conference for the unification of the expression of analytical results is given in detail. E. M. CHACE.

Use of Saponin for Homogenizing Samples of Milk to be Analyzed. A. FROUIN. *Ann. chim. anal.*, 16, 454.—After keeping milk for some months, as is frequently necessary, it often becomes difficult, by shaking alone, to render it homogeneous for sampling. The addition of bile assists in forming a uniform suspension, but the rapid putrefaction of bile makes the latter unsatisfactory. Recently saponin has been substituted. The milk is made neutral to litmus paper with NH_4OH, 0.01 g. saponin added for 200 cc. milk and the liquid heated at 40–56° for 10 min., with frequent shaking. The small amt. of saponin added does not modify the analytical results. A. W. BROOMELL.

Factory Managers' Butter Exhibition. M. A. O'CALLAGHAN. *Agr. Gaz. N. S. W.*, 22, 853–8.—Analyses and bacteriological exam. of butters, with discussion of causes of deterioration. G. A. ROUSH.

Detection of Benzoic Acid in Margarine, Butter, and other Fats. W. FRIESE. *Pharm. Zentr.*, 52, 1201–3.—Mix 100 g. of the sample with 25 cc. of 20% Na_2CO_3 soln. added in 5 portions during 5 min., and heat on water bath until the fat is melted. Cool on ice, decant off liquid through an opening made in the solid fat, and wash out with H_2O. Add cold $BaCl_2$ soln. in excess, filter, remove Ba with H_2SO_4, extract the clear filtrate with Et_2O, and detect the acid in the residue left on evapn. Extensive list of references follows. A. VORISEK.

Cheddar Cheese Making. G. C. SAWERS. *J. Dept. Agr. Victoria*, 9, 701–18.—Well illustrated descriptive article. G. A. ROUSH.

Casein and its Uses for Food. W. M. SEABER. *Sanitary Record*, 49, 20.—Casein is used extensively for the prep. of artificial foods. Many of these foods are prepared by secret processes. The comp. of some of the better known casein preps. is given. Many of these preps. have earned a place in dietetics. ARTHUR LEDERER.

Examination of Marmalades and Milk Chocolates. HÄRTEL. Leipzig. *Chem. Ztg.*, 34, 1256.—H. prefers to filter off the insol. matter, to wash, dil. the filtrate to a definit vol. and analyze aliquot parts of this. Simmich proposed a different method. No conclusion was reached. For milk chocolate, Baier and Neumann's method was recommended, also the detn. of the R.-M. no. which with a 10% milk addition is 2.8–3.0, with 20%, 5.6–6.0. E. J. WITZEMANN.

New Methods of Analysis of Honey. A. VERDA. *Schweiz. Wochschr.*, 49, 727–30, 739–42, 755–8.—Review of recent methods including Hartwich and Fehlmann's microscopical tests for pollen, tests by Lund and Schaffer (cf. *C. A.*, 4, 2682), Fiehe (*C. A.*, 3, 83, 458, 1189, 1654, 2325), Ley (*C. A.*, 1, 2497), and especially the recent biological tests by Langer, Galli Valerico and Thöni (cf. *C. A.*, 4, 332, 3098; 5, 2404, 3305). S. WALDBOTT.

Watkins Test for Determining the Cause of Slimy Bread. HUGO KÜHL. *Chem. Ztg.*, 35, 1321–2.—The test depends on assumption that the bacteria are spore formers

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which are very resistant to temp. of even 100°, the temp. of the interior of a loaf. In a 300 cc. E. flask, add 200 cc. H_2O, boil, add 2 g. flour so that no lumps form. Place flask in b. water for $^3/_4$ hr. To test tubes containing 10 g. rye meal, moistened with 5 cc. H_2O and sterilized, add $^1/_2$, 1, $1^1/_2$ cc., etc., of the flour soln. Keep at 25°, and at end of 24 hrs. exam. for first time; after 36 hrs. exam. again. The characteristic ester odor indicates presence of slime-forming bacteria. Pure cultures can be made by inoculating steril potato slices at 25° in Petri dishes. The colonies can be colored by carbolfuchsin. J. A. Le Clerc.

Aging of Flour and its Effect on Digestion. J. A. Wesener and George Teller. *J. Ind. Eng. Chem.*, 3, 912–9.—Digestion expts. were carried on both in pepsin and in pancreatin with flour and bread containing varying amts. of nitrites. Nitrites even to the extent of 1 per mille $NaNO_2$ do not interfere with the digestion of starch by diastase. HNO_2 and HNO_3 do not inhibit the activity of pepsin and may even wholly replace HCl in the initial stages of digestion. Nitrites in relatively large amt. do not inhibit pancreatic digestion. J. A. Le Clerc.

Notes on Benzine-extracted Meal. G. Koller. *Chem. Trade J.*, 49, 606.—The risk involved by the use of benzine-extracted meal in the manuf. of compd. cakes is great but when a non-inflammable solvent, *e. g.*, trichloroethylene is employed for the extraction of seeds, the risks of a dust-laden atm. are almost eliminated. J. A. Le Clerc.

The Quantitative Separation of Organic Phosphorus Compounds from Phosphates in Feeding Stuffs. G. Fingerling and A. Hecking. Versuchsstation, Hohenhain. *Biochem. Z.*, 37, 452–6.—The method of Stutzer (pptn. of phosphates with $CaCl_2$ and NH_3, soln. of ppt. with HNO_3, and repptn. as molybdate) was found accurate with lecithin, casein, nuclein, and Na nucleate. It was not accurate with phytin, and consequently requires modification before it can be used in analysis of the numerous plant materials in which this occurs. D. D. Van Slyke.

The Starch Equivalents of Feeding Stuffs. Wm. Goodwin. *J. Board Agr.*, 18, 721–35.—Discussion of different rations for farm animals, and methods of calculating them. G. A. Roush.

Myristone Obtained from Alfalfa. C. A. Jacobson. Nevada Agr. Expt. Sta. *J. Am. Chem. Soc.*, 33, 2048–51.—The alc. ext. of alfalfa meal was dried and extracted with ether and the ether soln. allowed to evap. to $^1/_2$ its vol. A ppt. which formed was filtered off and washed with ether, dissolved in hot acetone and filtered. Upon cooling the filtrate yielded a ppt. which, upon further purification seemed to have a const. comp. and m. p. 76.5–77°. The yield of this was 0.23% of the dry alfalfa. Upon treatment with hot HNO_3, this yielded 2.8% oxalic acid and a waxy mass, from which was extracted with hot acetone myristone with properties agreeing with those of synthetic preps. described by others. In m. p. detns. it began to soften at 68° and m. 74–75°. By reduction, the myristone yielded dimyristyl carbinol. Other products from the alfalfa are being investigated. P. A. Yoder.

The Melting Point of a Gelatin Jelly (Gamble). 5. Colorimetric Estimation of Salicylic Acid and Copper (Schott). 7. Preservation of Beet Pulp by the Lactic Ferment (Malpeaux). 28. Fluorescence Microscope (Reichert). 2.

U. S., 1,015,838, Jan. 30. A. Roberti. **Making cattle food from shredded straw and molasses.**

U. S., 1,015,950, Jan. 30. (Dedicated to the public.) H. C. Gore. **Removing astringency of Japanese persimmons and other fruits by treatment with carbon dioxide.**

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U. S., 1,016,046, Jan. 30. W. E. TAYLOR. **Preserving fish by pickling, steaming, drying and heating in oil.**

U. S., 1,016,293 and 1,016,294, Feb. 6. N. ROSEWATER. **Removing caffeine from coffee.**

U. S., 1,016,548, Feb. 6. C. H. CAMPBELL and PEARL T. CAMPBELL. **Treating milk to obtain a product with a reduced proportion of sugar.**

U. S., 1,016,656, Feb. 6. C. B. TRESCOTT. **Curing meat.**

U. S., 1,016,863, Feb. 6. W. R. WHITE. **Salting nuts in the shell.**

14. WATER, SEWAGE AND SANITATION.

EDWARD BARTOW.

Mineral Waters. GRÜNHUT. *Z. öffent. Chem.*, **17**, 403.—A classification of mineral waters is presented: (1) Pure natural mineral waters, exactly as drawn from the spring; (2) carbonated waters, with or without Fe; (3) artificial mineral waters. Detailed suggestions are given for labeling each. A table is presented of the conc. of the commonly occurring ions, one or more of which a water must possess to be classed as mineral. A. W. BROOMELL.

A Simple Method for Determining the Mineral Content and Hardness of Water. WUNDER. *Münch. med. Wochschr.*, **58**, 2611–3.—A simple cond. app. which can be used to det. the salt content of waters rapidly. A table shows equivs. in salt content of various milliampere readings. Lysol is used to det. the hardness and the results obtained agree well with chem. analyses of a large number of waters from various sources. H. J. CORPER.

The Determination of Nitrogen in Well and Rain-water by the Method of Von Schlosing. ALIDA HUIZINGA. *Chem. Weekblad*, **47**, 882.—With the von Schlosing method as used at the Rijksland Expt. Sta. at Groningen, reliable results are not always obtained. The water when evapd. must be made alkaline with KOH instead of MgO. MgO gave low results in every case. When nitrites are present, the old method does not give accurate results. Good results are obtained when the nitrites are oxidized with acid $KMnO_4$. The treatment of the liberated gas with NaOH to remove CO_2, does not reduce the vol. by consistent amts. in different expts. This is probably due to the fact that NO is not entirely insol. in NaOH. This difficulty is avoided by treating the residue, after oxidizing with $KMnO_4$, with acetic acid and evapg. to dryness to remove CO_2. The material can then be introduced into the Schlosing app. and the N detd. in the usual manner. The results obtained are accurate for 0.1 mg. N.
H. L. HUENINK.

The Relation of Oxygen Loss in Natural Waters and Artificial Nutrient Solutions to Bacterial Growth. A. MÜLLER. *Arb. Kais. Gesundh.*, **38**, 294–326.—Previous investigators have shown that the bacterial content and the loss of O in water are often proportional. M. detd. at short intervals the magnitude of O loss under aerobic bacterial conditions. In the 1st series of expts. 3 specimens of river water were used: (1) From the Spree, (2) the same containing 4% added drainage water, and (3) Rhine water containing 4% drainage water. Detns. were made, usually at 3-hr. intervals, of total bacterial count, *B. coli*, and dissolved O. The expts. were continued for 120 hrs. In the 2nd series of expts. nutrient solns. were treated under varying conditions with either *B. fluorescens liquefaciens*, *B. coli*, or a mixt. of both. The general conclusions are that while the bacterial content and the loss of O in natural waters are not always exactly proportional, the former is causally connected with the latter. With

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rise in bacteria there is a rise in the hourly O loss, and *vice versa*. After the latent stage the hourly O loss is a measure of the bacterial food present in the water. In artificial nutrient solns. the O losses caused both by *B. fluorescence liquefaciens* and *B. coli* are proportional. The hourly O loss increases up to complete disappearance of O. As the bacterial count increases the age of succeeding generations decreases. When developing under like conditions, *B. fluorescens liquefaciens* requires about 6 times as much O as *B. coli*. The O needed for maintaining bacterial life is only about $^1/_{10}$ that required for its development. The energetic evolution of O frequently seen in river water is due in large measure to the fact that bacteria are in course of development, and not to the fact that large numbers are already present. Such evolution of O is also an indication that the water contains organic material of such a kind and in sufficient quantity as readily to promote bacterial growth. Under anaerobic conditions the loss of combined O apparently occurs in a manner similar to that of dissolved O under aerobic conditions. When both *B. fluorescens liquefaciens* and *B. coli* are added to water the development of the latter is markedly suppressed. P. B. DUNBAR.

The Effect of Dyes Employed in Paper Manufacture upon the Fauna of Streams. A. THIENEMANN. Münster. *Z. Nahr. Genussm.*, 22, 465.—The effect of 16 dyes in dilns. ranging from 1–1000 to 1–1,000,000 upon various water worms, larvae, snails, fish and crustacea was studied. Orange III, Orange R. O., "Fixier" scarlet, Bismark brown and brilliant black B were regarded as harmless. Rhodamine B and metanil yellow P. L. were injurious only to the most sensitive forms. Vesuvin, auramine, rhodamine B extra and fuchsin A. B. were slightly poisonous. Victoria blue, methyl violet, methyl violet B.B. extra, carbon black B.T. and diamond green B. were very poisonous, killing most forms in dilns. of 1–1,000,000. A. F. SEEKER.

Automatic Regulating Devices for Water Purification Plants. THOMAS FLEMING. *Chem. Eng.*, 14, 494. W. F. LANGELIER.

Technical Application of Ultraviolet Rays in the Sterilization of Water. E. BERTARELLI. *Centr. Bakt. Parasitenk. I Abt. Ref.*, 50, 705.—A review. F. C. KOCH.

Sterilization of Water by Ultraviolet Rays. G. ERLWEIN. *J. Gasbeleucht*, 54, 955–9 (illus.); *J. Soc. Chem. Ind.*, 30, 1228.—Expts. were made with metal electrode arc lamps and quartz Hg lamps. Fe metal arc lamps under the various conditions of the expt. showed a bacterial reduction of 70 to 50%. The results with the quartz Hg lamps were much more satisfactory. In some cases the bacteria were entirely eliminated. The future of sterilization by the aid of ultraviolet rays seems to be assured. The quartz Hg lamps must be improved however. ARTHUR LEDERER.

Operation of a Slow Sand Filter with Lake Erie Water. ANON. *Eng. Record*, 65, 52–3.—Two filters for O. N. G. camp, capacity 102,700 gal. per day, gave av. bacteria per cc. fine sand 66, and coarser 91. H. V. MAIN.

The Mode of Operation of Biologic Filters. F. GUTH AND I. FEIGL. *Gesundh. Ing.*, 34, 941–7.—The conversion of putrescible matter into stable matter in biologic filters depends upon the presence of microörganisms or ferments in the presence of O. The N is oxidized to a great extent and the S completely oxidized. The biologic filtration process is not a purely chem. oxidation. The substitution of an inactive gas in the place of O results in a putrescible effluent. This proves that the presence of aerobic organisms is essential. The chem. process, however, is likewise of great importance. An interchange of O between highly oxidized and unstable substances takes place. The nitrates are the end products of the conversion of organically bound N. In the light of previous investigations the purification in a filter must be looked upon as a biochem. action. ARTHUR LEDERER.

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Water Purification at Harrisburg, Pa. J. M. CAIRD. Water Dept. Harrisburg, Pa. *Ann. Rpt.*, 1911, 35–44.—A high standard of efficiency is shown. 99.66% of bacteria have been removed during the past 6 yrs. The turbidity with a max. of 1255, min. 3, av. 54 parts per million has been removed. The color max. 32, min. 2, av. 10 parts has been eliminated. It was necessary to use soda ash an av. of 21 days each year during the 6 years. E. BARTOW.

Water Purification at Columbus, Ohio. W. W. JACKSON. *Rept.;* through *Eng. Record*, 65, 44–5.—Temporary hardness reduced with lime, permanent with soda ash from 111 to 35 parts per mil.; turbidity 37–0, with Fe or $Al_2(SO_4)_3$; bacteria reduced from 9400 to 24 per cc. Cost per mil. gals.: Storage $0.88, purification $14.92, pumping $8.97. H. V. MAIN.

Ozone Water Purification Plant at St. Petersburg, Russia. ANON. *Eng. News*, 66, 783.—The water is first clarified with $Al_2(SO_4)_3$, settled, and filtered. 126 ozonizers of the Siemens and Halske type are operated for a plant which furnishes 13,200,000 gals. per day. The bacteriological results are very satisfactory. A. LEDERER.

Protection of Steel Pipes. A. D. FLINN. N. E. W. W. Assn. *Can. Eng.*, 22, 205–8.—Details of expts., specifications and methods are given for concrete 6 in. thick outside and cement mortar lining 2 in. thick inside, with contract prices. LANGDON PEARSE.

Wasteful Systems of Sewage Purification. J. GROSSMANN. *Can. Eng.*, 22, 210. —A brief summary of the sludge problem, and the futility of an adequate solution until moisture and greasy matter are removed at low cost, to make a steril manure. LANGDON PEARSE.

Sewage Treatment by Slate Beds at Devries, England. F. G. BILLINGHAM. *The Surveyor*, 40, 755; *Eng. News*, 67, 176.—6 slate beds, 68 × 45 ft., 2 storm water beds 80 × 68 ft., 10 coke breeze beds 68 × 45 ft., and 2 grit chambers, are handling a dense sewage, 240,000 gals. per day. Slate beds fill in 2½ hrs., rest 3 hrs., empty slowly. Humus is drained on ash bed. Est. 20–30 long tons sludge per yr. Annual cost under $975. LANGDON PEARSE.

Sewage Disposal Experience of a Small Town. F. L. STONE AND LANGDON PEARSE. Ill. Soc. Engrs. & Surveyors, 1912. *Eng. Record*, 65, 109; *Eng. Contr.*, 37, 160–1.—The Wheaton (Ill.) septic tank is described, and the nuisance caused thereby in a dry ditch. The problem of disposal is discussed. Analyses of the sewage, tank effluent and sludge are given. LANGDON PEARSE.

Sewage Clarification and Sludge Treatment at Elberfeld, Germany. CHARLES SAVILLE. *Eng. News*, 67, 169–70.—A discussion of a translation by E. Kuichling (cf. *C. A.*, 6, 661) with full personal data on the Elberfeld plant, compared with Emscher plants. The inaccuracy of the data translated is discussed. LANGDON PEARSE.

The Waterproofing of Sewers. Natl. Assoc. Cement Users, 1911. *Can. Eng.*, 22, 201–3.—A summary is given of the infiltration into sewers in various cities and the methods to waterproof. The use of elastic joints in tile sewers is discussed. LANGDON PEARSE.

Irrigation with Sewage. P. A. MAIGNEN. *Eng. Record*, 65, 82–3.—A note on the use of sewage with suggestions for modern practice. LANGDON PEARSE.

Some Engineering Problems Connected with Biological Sewage Treatment in Canada. T. A. MURRAY. Can. Pub. Health Assn., 1911. *Eng. Contr.*, 37, 129–30. —The engineering aspect of the Lethbridge tank is described with notes on distribution by rotary sprinklers, size of material and covers in winter for sprinkling filters. LANGDON PEARSE.

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The Need of Well Considered Design and Efficient Operation of Sewage Disposal Plants. LANGDON PEARSE. Ill. Soc. Engrs. Surveyors, 1912. *Eng. Contr.*, 37, 126–7.—A review of current practice with a note of caution in scrutinizing data, and on testing plants. The Atlanta, Brockton and Worcester plants are illustrated.
LANGDON PEARSE.

Unusual Sources of Copper. J. W. DOUGAL. *Pharm. J.*, 87, 882–3.—Cu, as well as Pb, Cr and Zn are abnormal constituents of sewage water, and by their bactericidal action may inhibit its purification. S. WALDBOTT.

Sewage Disposal in U. S. and Abroad. L. PEARSE. *J. Western Soc. Eng.*, 16, 565. W. F. LANGELIER.

Settling Basins "Waldenburger Trichter" (Funnels). A. VOGT. *Tech. Gemblatt*, 1911, 147–50; *Wasser u. Abwasser*, 5, 6.—The "Waldenburger Trichter" differs from the Emscher tanks and the other settling devices with sep. sludge digestion chambers, in that they have a covered compartment in the middle, into which the floating suspended matter is conveyed. Here it is allowed to ferment. A vent is provided. The rest of the plant consists of a funnel-shaped settling basin with a hood to take care of the escaping gases. The covered compartment is located in the middle of the hood. Such a plant could be advantageously installed for individual houses and for cities. ARTHUR LEDERER.

The Biological Disposal of Waste Yeast. W. I. DIBDIN. *Sanitary Record*, 46, 601; *Wasser u. Abwasser*, 5, 2.—The best method to destroy waste yeast is to permit contact with Infusoria in thin layers on the surface of a liquid. The Dibdin slate bed is well adapted for this purpose. It is best to mix the waste first with the effluent of a biologic filter and to ppt. the mixt. with CaO and Fe; then it should be permitted to stand for 2 hrs. ARTHUR LEDERER.

Fish Poisoning Due to Cyanide Compounds in the Trade Wastes of Iron Works. P. LEHNKERING AND L. DIESFELD. *Wasser u. Abwasser*, 5, 1.—In July, 1911, in the Lower Ruhr fish life disappeared nearly completely. The preliminary investigation directed suspicion toward an Fe works located on the river. Of 3 trade waste effluents examd., 1 originating from the gas purification plant, gave a distinct HCN odor. Qualitative reactions proved the presence of HCN and CN compds. One l. of the effluent contained 0.0068 g. HCN. Animal expts. substantiated the poisonous character of the waste. 200 cc. of the waste added to 2 l. of fresh tap-water caused the death of gold fish inside of $^1/_2$ hr. ARTHUR LEDERER.

Chemical Effect of Ultraviolet Rays (ANDREEV). 2.

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15. SOILS AND FERTILIZERS.

F. P. VEITCH.

Solubility Determinations in Agricultural Chemistry. ARTHUR RINDELL. *Helsingfors*, 1910.—It is pointed out that the various methods of detg. available plant food are rather empirical and of questionable value. The real solution of the question of available plant food lies in the field of physical chem. M. X. S.

Soil Surveys and Soil Analyses. A. D. HALL AND E. J. RUSSELL. *J. Agr. Sci.*, 4, 182–223.—Since present conventional methods of chem. analyses fail to characterize soils with sufficient completeness, the authors recommend that for soil surveys a large number of soils should be submitted to mechanical analysis, which should include the dctn. of org. matter and $CaCO_3$. A carefully chosen representative set should be

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analyzed chemically and compared with a typical sample of the region from which the soils come. M. X. SULLIVAN.

Water Requirements of Crops in India. II. J. W. LEATHER. *Mem. Dept. Agr., India, Chem. Ser.*, 1, 205–81.—Previous expts. (*Ibid.*, 133–84) are continued. The transpiration ratios of a crop on different soils show that the nature of the soil has no influence on the ratio, provided the water supply does not fall below a certain conc. The conc. of water in the soil which is necessary for good development varies largely with the nature of the soil. In the field the action of plants is to cause a marked decrease in conc. throughout a number of ft. of soil. The soil within the root range is at harvest time frequently more desiccated than it would be if it had been fallow. After the crop there is a slow upward movement of water. M. X. SULLIVAN.

Assimilation of Nitrogen by Rice. W. P. KELLEY. Hawaii Agr. Expt. Sta., *Bull.* 24; *J. Soc. Chem. Ind.*, 30, 1272.—The expts. were made to contrast the value of $(NH)_2SO_4$ and $NaNO_3$ as N fertilizers for rice. In field trials $(NH_4)_2SO_4$ produced considerable increase in the yields of straw and grain, and when applied before planting gave greater yields than when applied at intervals during growth. $NaNO_3$ was without effect, however applied. In pot expts. $NaNO_3$ was of value only when applied near the "heading" period of the rice. Soy-bean cake produced considerable increase, but $(NH_4)_2SO_4$ was the most effective. In paddy soils denitrification takes place, resulting in the formation of nitrites. NH_3 is developed during the time of irrigation and the nitrates originally present become reduced to a very small quantity. The greatest quantities of recoverable NH_3 occur where $(NH_4)_2SO_4$ is applied; measurable increases in the amt. of NH_3 in the soil are found after 1 and 2 months' growth of the rice. Expts. in flasks show that formation of NH_3 takes place to a considerable extent in submerged rice soil. Sand cultures show that when nitrates are the only source of combined N, unhealthy and stunted growth follows. In practice the use of ammonium salts and not nitrates is recommended for rice culture. The failure of rice to assimilate nitrates properly may be due to a lack of nitrate-reducing enzymes. Possibly rice, having grown for centuries under conditions that largely exclude the formation of nitrates, has in a measure lost the power of reducing nitrates. J. J. M.

The Color of Soils. W. O. ROBINSON AND W. J. MCCAUGHEY. U. S. Dept. Agr., Bur. Soils, *Bull.* 79, 29 pp.; *Expt. Sta. Record*, 25, 424.—This reports the results of studies on causes of colors and their relation to productiveness in soils, with particular reference to red and yellow soils, and on physical and chem. properties of Fe compds. and their solns. Generally speaking, the color of a soil is dependent upon the content of organic matter and Fe_2O_3, the latter being more or less hydrated. The thicker the film of organic matter and Fe_2O_3 coating the soil grains, the darker the soil. It is probable that the thickness of film surrounding the soil particles is the predominant factor detg. color. Decaying organic matter was found effective in causing a soln. of Fe in the soil water. The dissolved Fe is transported only to a limited extent, owing to the readiness with which it is oxidized to the slightly sol. Fe_2O_3. The authors are of the opinion that sufficient difference does not exist between soil temp. of the northern and southern states to cause a change from hydrated to a dehydrated Fe oxide. Mineralogical exam. showed larger proportion of secondary quartz grains in red than in yellow soils, the secondary grains being characterized by included Fe stains and by not possessing the clear gaseous or liquid inclusions which characterize the primary quartz particles. Basic rocks, or rocks rich in ferrous minerals, yield a red soil, and acid rocks, which are relatively low in Fe-bearing minerals, give a yellow soil. Red soils may also result from yellow soils by continued weathering agencies with little erosion, and yellow soils from red soils where erosion agencies and water transport have been active. J. J. M.

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The Improvement of Marsh Soils. LUEDECKE. *Z. Landw. Kammer Schlesien*, 15, 266–72, 300–6, 333–8; *Expt. Sta. Record*, 25, 216.—A discussion of the fertilizer constituents, agr. value, and reclamation of these soils. J. J. M.

The Movement of Soil Material by the Wind, with a Bibliography of Eolin Geology. E. E. FREE AND S. C. STUNTZ. U. S. Dept. Agr., Bur. Soils, *Bull.* 68, 272; *Expt. Sta. Record*, 25, 424. J. J. M.

Soil Erosion. W. J. MCGEE. U. S. Dept. Agr., Bur. Soils, *Bull.* 71, 33; *Expt. Sta. Record*, 25, 425. J. J. M.

The Hygroscopicity of Norwegian Nitrate. VON SIGMUND HALS. Christiana. *Chem. Ztg.*, 35, 1130.—Norwegian nitrate, $Ca(NO_3)_2$, is much more hygroscopic than $NaNO_3$ and so cannot be kept in sacks. Samples stored in barrels covered with thick paper, however, were found to have taken up only 3% of their wt. in 312 days and consequently had suffered no deterioration as fertilizer. M. X. S.

The Hygroscopicity of some Newer Nitrogen Fertilizers. H. v. FEILITZEN AND I. LUGNER. *Chem. Ztg.*, 35, 985–6.—The various N-containing fertilizers are more or less hygroscopic, $NaNO_3$ and lime-N least so, $(NH_4)_2SO_4$ more so, and $Ca(NO_3)_2$ and "sodium nitrite nitrate" particularly so. Mixts. of lime-N and $Ca(NO_3)_2$ took up considerably more water than the sum of the ingredients alone. M. X. SULLIVAN.

Tests of Nitrite in Pot and Field Experiments. B. SCHULTZ. *Landw. Ztg. Fühling's*, 60, 346–51; *Expt. Sta. Record*, 25, 518.—In comparative tests of $Ca(NO_2)_2$, $Ca(NO_3)_2$, and $NaNO_3$ it was found that the yield of cereals was reduced to a marked extent in the case of $Ca(NO_2)_2$. The nitrite is therefore an objectionable constituent of com. $Ca(NO_3)_2$ for fertilization purposes. J. J. M.

Potassium Fertilizers. F. BRUNERIE. *J. Agr. Prat.*, 21, 141–3; *Expt. Sta. Record*, 25, 518.—Summarizing the results of 5 yrs. field expts., B. concludes that the use of K salts was profitable on a soil containing 0.01% of K and 0.008% each of N and phosphoric acid and with variety of crops. J. J. M.

A New Method of Using Potash Salts and other Fertilizers. L. HILTNER. *Mitt. Deut. Landw. Ges.*, 26, 231–3; *Expt. Sta. Record*, 25, 518.—This article gives the results of comparative tests of kainite, $Ca(NO_3)_2$, $MgSO_4$, $FeSO_4$, milk of lime, humus, and various other substances applied to the above-ground portion of potatoes and other crops, which indicated a marked fertilizing effect from several of these substances. In other expts. K chloride, sulfate, and phosphate were applied to the soil and painted upon the leaves of the plant. In the majority of cases better results were obtained by the latter method of application than by the former. J. J. M.

The Distribution, Composition and Cost of Lime. H. D. HASKINS AND J. F. MERRILL. *Mass. Sta. Bull.*, 137, 7–19; *Expt. Station Record*, 25, 519.—This gives information regarding the sources of lime in Mass., the comp. of different forms of lime, and analyses and valuations of samples of com. lime. The kinds of lime suited to different conditions are indicated. J. J. M.

A Theory Regarding the Manganese Soils and Pineapples. C. C. JAMES. *Hawaii Forester Agr.*, 8, 176–8; *Expt. Sta. Record*, 25, 731.—In a brief dicussion of the Mn soils of Hawaii, the mineral content of pineapples and sugar cane, and the various manganic compds., J. assumes that the toxic action of these Mn soils on pineapples is due to the action of Ca manganite primarily and to the secondary action of other salts and acids upon the Ca manganite. J. J. M.

The Fertilizing Value of Rain and Snow. F. T. SHUTT. *Ottawa Nat.*, 25, 99–100; *Expt. Sta. Record*, 25, 719.—In continuation of observations previously noted (*E. S. R.*, 24, 417) it was found that the rainfall at the Ottawa Exp. Farm during the year ended February 28, 1911, was 19.67 in. and the snowfall 7.3 in., representing a total

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pptn. of 26.97 in., about 10 in. below the av. for the locality. This pptn. furnished 5.271 lbs. of N per acre. Of the av. N (4.424 lbs. per acre) from 1908 to 1911, 84% was supplied by the rain. Of the total N, 3.733 lbs. was in the form of NH_3.

J. J. M.

Action of Sulfur as a Fertilizer. E. CHANCRIN AND A. DESRIOT. *J. agr. prat.*, 21, 427–9; *Engrais*, 26, 684–5; *Rev. gén. sci.*, 22, 392–3; *Expt. Sta. Record*, 25, 519.—In Germany, in 1909, the use of S for potato diseases was not only effective in reducing the disease but increased the yield of potatoes. The authors report expts. in which S was used at rates of 250–500 kg. per hectare in connection with superphosphate, K_2SO_4 and $NaNO_3$. The beneficial effect of the S may be due to action similar to that of partial sterilization by heat, CS_2, toluene, etc. J. J. M.

Citrus Experiments. A. W. BLAIR. *Florida Sta. Rpt.*, 1910, 25–34; *Expt. Sta. Record*, 25, 427.—A brief account dealing especially with fertilizers, the installation of air and soil thermographs, the comp. of soils used and of orange leaves and stems, and the installation of soil tanks for supplementary studies on the fertilizer requirements of itrus fruits (cf. *E. S. R.*, 25, 117). J. J. M.

Treatment of Soils with a Strong Electric Current. J. KÖNIG, J. HASENBÄUMER AND C. HASSLER. *Z. angew. Chem.*, 24, 2341.—An elec. current of 220 v. and 3 amp., passed through soil covered with water dissolves out the easily sol. inorganic material which is bound up with the soil colloid. K is easily dissolved out, P_2O_5 less readily. Humus colloids exercize considerable influence on the solubility of the plant nutrients. The material dissolved out by elec. is much the same as that readily available for plants. As far as K is concerned, the single treatment with the elec. current puts into soln. as much as does treatment with H_2O_2 and steam and all 3 dissolve from soil 20 cc. deep about the same amt. as the plants take out. As a test for available plant food the single treatment with the elec. current is reliable. M. X. SULLIVAN.

The Results of Electroculture in Hedewigenkoog. CLAUSEN. *Landw. Wochenbl. Schles. Holst.*, 61, 83–6; *Expt. Sta. Record*, 25, 328.—The data obtained in expts. with clover, wheat, and oats do not indicate that the action of the elec. installation had any effect upon the growth of the crops. J. J. M.

A New Ammonia Salt. *Saaten Dunger u. Futtermarkt.*, 219–20; *J. agr. prat.*, 21, 300–1 (1911); *Betterave*, 21, 103–4; *Expt. Sta. Record*, 25, 322.—This article briefly describes a cheap process for preparing a by-product of gas manuf. consisting mainly of $(NH_4)_2SO_3$ and $(NH_4)_2SO_4$. Good results were obtained with this material in comparison with $(NH_4)_2SO_4$ in fertilizer expts. on wheat, rye, oats, barley, potatoes, beets and grass. J. J. M.

Results of Fertilizer Experiments with Potassium Silicate and Like Substances during 1910. *Wein. deut. landw. Presse*, 38, 291–2; *Expt. Sta. Record*, 25, 217.—Fertilizers of this character were very effective and gave good returns. J. J. M.

Value of Different Crops as Green Manures. A. D. HALL. *J. Bd. Agr. London*, 17, 969–74; *Expt. Sta. Record*, 25, 216.—Attention is called to results of expts. at Rothamsted on heavy soils which do not agree with those of expts. at Woburn on light soils as to showing that mustard is more effective as a green manure for wheat than vetch. In the Rothamsted expts. the yield and N content of wheat were uniformly higher following crimson clover and vetch than after mustard or rape. J. J. M.

Penetration of Soluble Fertilizers into the Soils. A. DEMOLON AND G. BROUET. *Ann. sci. agron.*, 6, 401; cf. *C. A.*, 6, 132.—Even in sandy soils, nitrates are retained relatively near the surface. J. A. LE CLERC.

Properties of Aluminium Nitride and its Uses. E. KOHN-ABREST. *Bull. assoc. chim. sucr. dist.*, 30, 1010–8. A. H. BRYAN.

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The Destruction of Weeds by Chemical Means. H. C. LONG. *Sci. Am. Sup.*, 71, No. 1831, 76–7; No. 1832, 93–4; *Expt. Sta. Record*, 25, 37.—General discussions of the prevalence, injury and coöperative destruction of weeds are followed by a review of work of spraying already noted from various sources. Bibliography is given. J. J. M.

Various Applications of Explosives. CARL DAGER. *Z. ges. Schiess-Sprengstoffw.*, 6, 424–5.—NH_4NO_3 explosives containing a small amt. of gelatinized nitroglycerin are particularly adapted for agricultural work and the blasting of loose materials. C. G. STORM.

Oxidation of Arsenites to Arsenates in Cattle-dipping Tanks. W. F. COOPER AND G. A. FREAK. *J. Agr. Sci.*, 4, 177.—The alkaline Na arsenite soln. employed for the purpose of dipping cattle for the eradication of ticks, oxidizes more or less completely to the arsenate upon standing in the dipping tank. The rapidity of this oxidation is increased by the presence of other ingredients in the mixt. Expts. carried out in the lab., using mixts. of Na_3AsO_3 and wood tar (with castor oil soap as an emulsifying agent), and the same with cresylic acid in place of the wood tar, showed some oxidation of the arsenite to arsenate. The oxidation in solns. containing wood tar was the greater. In both cases oxidation was much greater in solns. exposed to direct sunlight. As in the form of the arsenate is not nearly so efficacious for the eradication of ticks as the arsenite. C. C. MCDONNELL.

Uses of Peat for Fuel and other Purposes (DAVIS). 21. Effect of the Greater Application of Nitrogen on Sugar Beets (HEEKE). 28. Influence of Common Salt upon the Germination of Beet Seed (VASILIEV, POMASKII). 28.

U. S., 1,015,302, Jan. 23. A. DICKSON. **Separating nitrogenous matter from sewage and distillery wash.**

U. S., 1,015,720, Jan. 23. F. S. WASHBURN. **Process of and apparatus for making calcium cyanamide from calcium carbide.**

U. S., 1,016,352, Feb. 6. C. N. MERIWETHER. **Fertilizer.**

U. S., 1,016,638, Feb. 6. A. L. LASKA. **Dye derived from β-diazoanthraquinone and β-naphthylamine.**

Can., 137,684, Jan. 2, 1912. T. KNOSEL. **Fertilizer made by neutralizing the waste lye of sulfite cellulose and mixing with $CaH_2N.CN$.**

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16. FERMENTED AND DISTILLED LIQUORS.

ROBERT WAHL.

Judging Wines by the Low Alkalinity of the Ash. W. T. BARAGIOLA AND P. HUBER. *Mitt. Lebensmittelunters. Hyg.*, 1, 158–69; through *J. Chem. Soc.*, 100, II, 662.—The authors conclude that a low alkalinity number of the ash of wines should not be used for judging the quality of the sample unless the cause of the fall is known. It should, therefore, be detd. whether there is an unusual amt. of sulfate or chloride and phosphate present, which of course would lower the % of alkalinity in the ash, without, however, causing a decreased alkalinity per l. of wine. C. A. N.

The Analysis of Brandy in Case the Amount of Sample is Very Small. M. X. ROCQUES. *Ann. fals.*, 4, 641.—With 125 cc. of sample a complete analysis can be obtained while 100 cc. suffices for all detns. except aldehydes and furfural. Proceed as follows: Take the proof with a spindle and then measure the total vol. of the sample

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available. Pipet off 10 cc. and titrate total acids. Place the entire vol. of the liquid remaining, together with the titrated portion, in a flask and distil to definit vol. The proof of the distillate gives the true EtOH content. The residue may be evapd. for the detn. of solids, deducting the wt. of alkali used in titrating the acids in the 2nd operation. A measured amt. of the distillate is then used for the detn. of esters, the residue from the last operation being then refluxed with aniline phosphate for 1 hr. and distilled, fusel oil being detd. upon the distillate. If the original sample amts. to 125 cc. sufficient distillate remains after taking a portion for the detn. of esters that 10 cc. may be used for the detn. of aldehydes and 10 cc. for furfural. Fixed acids may also be detd. by titrating the residue remaining from the first distillation.

A. F. Seeker.

The Fermentability of Acid, Beer, and Wort Dextrins by Various Yeasts and Mold Fungi. P. Lindner and O. Mohr. *Wochschr. Brau.*, **28**, 393–5.—The action of yeast on 1 acid dextrin ($[\alpha]_D$ = 194°), 3 beer dextrins ($[\alpha]_D$ = 153°, 156°, 189°) and 1 wort dextrin ($[\alpha]_D$ = 156°) and Kahlbaum's acid dextrin ($[\alpha]_D$ = 181°) was studied. Distillery yeast (Race II) pressed, and wine yeast cultivated on wort agar for 11 yrs. have lost the power of fermenting Kahlbaum's dextrin. *Sacch. capsularis* and the mold fungi (*Monila variabilis*, *Sachsia suaveolens*, *Amylomyces rouxii*, Amyl. β) ferment all the dextrins vigorously and about equally, *Sachsia suaveolens* being least active. *Schizosacch. pombe* and *S. octosporus* ferment the dextrins less vigorously than the above, and act better at 32° than at lower temp. *S. mellacei* only acts readily on Kahlbaum's dextrin. *Sacch. pastorianus*, I. and *Sacch. ellipsoideus*, I. ferment some of the dextrins slightly but distillery, pressed, and wine yeast generally do not. Top and bottom beer yeasts ferment the dextrins more generally, but only slightly. On the whole, the behavior of the various dextrins as to fermentation is very similar.

C. A. Nowak.

Behavior of Yeast under Practical Conditions in Relation to its Chemical and Physiological Properties. F. Schönfeld and W. Hirt. *Wochschr. Brau.*, **28**, 421–2, 436–8.—The results of investigations made by the authors and by others on the chem. comp. and the physical and physiological properties of the yeast D and K of the Versuchs und Lehrbrauerei, Berlin. C. A. Nowak.

Advantages of Pure Yeast in the Fermentation of Strongly Sulfured Must. R. Haid. *Allgem. Wein. Z.*, 1911, No. 27; through *J. Soc. Chem. Ind.*, **30**, 1133.—Culture yeasts being more resistant to SO_2 than wild yeast, it can be used for the fermentation of strongly sulfured musts. Spontaneous fermentation of must was prevented by 150 mg. SO_2 in the form of Na H sulfite per l.; when, however, 1% of pure yeast was added 200 mg. or more of SO_2 per l. only retarded fermentation, which proceeded regularly with normal velocity. C. A. Nowak.

The Valuation of Hops by Analysis. E. Moufang and A. Scheer. *Wochschr. Brau.*, **28**, 449–52.—An especially constructed vessel for holding the finely ground hops during mashing was used. It was found that the max. yield of ext. was obtained by mashing 20 g. of the finely divided hops with 265 cc. H_2O, at a temp. of 90° for 55–60 min. The limit of error in the detn. was found to be 0.2–0.3%. C. A. N.

Influence of the Fineness of Grist and Different Mashing Processes on the Yield of Extract from Malts Prepared from the Same Barley with Different Periods of Flooring. C. Bleisch and H. Leberle. *Z. ges. Brauw.*, **34**, 485–90.—The yield of ext. obtainable both with coarse and fine grists from 4½-, 5½-, 6½- and 7½-day malts was detd. The max. yield is obtainable 1 day earlier than at the end of the normal flooring period (7 days). Fine grinding is an important means of increasing the yield of ext. from short floored malt. The diff. in yield of ext. (fine and coarse grist) with 4½-day malt is about 3.5%. C. A. Nowak.

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U. S., 1,015,443, Jan. 23. R. HOFFMANN. **Apparatus for macerating wort.**

U. S., 1,016,291, Feb. 6. C. S. ROBISON. **Removing solid material from brewers' slops and drying it.**

Ger., 229,911, Feb. 3, 1910. H. V. LAKEN. **Wort-cooking apparatus with steam radiator of adjustable size.**

17. PHARMACEUTICAL CHEMISTRY.

M. I. WILBERT.

Chocolin, a Laxative Chocolate. GÖRGES. Berlin-Oberschönweide. *Deut. Med. Wochschr.*, 37, 52, 2428–9.—G. has successfully used a laxative composed of powdered cocoa, *Manna cannelata* and 0.5% phenolph. H. J. CORPER.

Paraaminophenylarsenic Tetraiodide (Preparation—Toxicological Experiments). ALDO PATTA AND PIERO CACCIA. Univ. Pavia. *Arch. farm. sper.*, 12, 546–54.—A new method for preparing this substance consists in warming *p*-aminophenylarsenic acid with HI (d. 1.7). On cooling, a brown mass seps. from which the greater part of the free I is removed by placing in a desiccator over KOH. It is then recrystd. from b. AcOH and obtained in red crystals, m. 140°. Yield, 70%. This deriv. is more poisonous than atoxyl. 0.6–0.8 g. per kg. body wt. was fatal to rabbits. A. W. DOX.

A Cinchona Disease. A. RANT. *Med. intg. van het Dept. van Landbouw*, 1911, 13; through *Chem. Druggist*, 79, 182.—A fungous mold, *Corticium javanicum* Zimm., attacks the stems and branches of cinchona trees and many other plants. 4 varieties were recognized in the cultivated specimens. The fungus grows best in an acid medium and appears to eat its way into the plant, thus destroying certain cells and breaking the stream of sap, while brownish spots appear on the branches. The leaves of infected cinchona acquire autumn tints and die often without falling off. Humidity and shade promote the spread of the disease. The preventive measures are given. *C. ledgeriana* is more susceptible than *C. succirubra*. A. VORISEK.

Chemical Examination of Calabar Beans. A. H. SALWAY. *Pharm. J.*, 87, 719; *J. Chem. Soc.*, 99, 2148–59; *Proc.*, 27, 273.— In the U. S. P. method of assay the 3 extractions with Et_2O were found insufficient to remove all the alkaloid completely; 0.091% instead of 0.179% being obtained. The physostigmine is dimorphous m. 86–7° and 105–6°, resp., and the 2 forms are interconvertible. A new strongly myotic alkaloid *physovenine*, $C_{14}H_{18}O_3N_2$, m. 123°, was found, and also *calabarol*, $C_{28}H_{34}O_3(OH)_2$, m. 245° and giving dibenzoyl derivs. m. 195–6°. In addition to some essential oil, resin and other amorphous constituents, the presence of trifolianol, eseramine, stigmasterol, silosterol, the glycerides of behenic, stearic, oleic, palmitic, linoleic acids and a sugar was confirmed, but no "isophysostigmine" of Ogui nor "eseridine" of Böhring & Söhne could be found. A. VORISEK.

The Quantitative Determination of Arsenic in Organic Substances with Special Regard to the Organic Compounds of Arsenic (Salvarsan, Etc.). P. BOHRISCH AND F. KÜRSCHNER. *Pharm. Zentralhalle*, 52, 1365–71, 1397–1400.—From urin, containing added As, was recovered 95.8% of As_2O_3 by the Fresenius and Babo method while by distillation (a modified method of Jannasch and Seidel), 118.7% was indicated. Even after the organic matter was destroyed by Cl, the latter method gave 114% As_2O_3. In a blank, the distillate was found to consume I, which accounted for the high results. The modified distillation method gave with arsacetin, atoxyl and salvarsan satisfactory results. In a 0.5 l. flask are mixed 50–75 cc. of the sample soln., 100 cc. HCl, 4 g. hydrazine sulfate and 2 g. KBr and the distillation carried on slowly until

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the residue is nearly dry (1 hr.). The distillate is neutralized with NaOH, 2 g. $NaHCO_3$ added, and the soln. titrated with 0.1 *N* I, using starch soln. as indicator. When the quantity of organic matter is large, its destruction (with Cl) before distillation must be made, while in the case of urin, the As in the distillate should be detd. gravimetrically. A. VORISEK.

Jamaica Camphor. H. W. EMERSON AND E. R. WEIDLEIN. *J. Ind. Eng. Chem.*, 4, 33–6.—The yield of crude oil and camphor prepared by steam distillation from green leaves was 2.35%, with 1.32% pure camphor (*C*); dried leaves, 2.54% with 1.569% of *C*, and 0.437% of pure oil; leaves from dead trees gave 1.39% of crude *C*. Twigs from green leaves, 1.16% of which 0.58% was *C* and 0.255% oil of *C*; dried leaves, 0.5445% of *C*, wood, 0.61% of *C*. The *C* obtained m. 175.5°, when resublimed and recryst. from petroleum ether, 177°, b. p. 204.5, d_{18} 0.98, $[\alpha]_D$ 42.82°. The oil, d_{15} 0.915. This contained 25.25% of *C* and 18.5% of safrol and eugenol. The results were held to show that in Jamaica extraction of camphor from the leaves may be successfully practiced. A. VORISEK.

Adulteration of Anise Oil. J. C. UMNEY. *Perf. Ess. Oil Record*, 2, 273–4.—Oils having abnormal constants were found insol. in 3 or even 5 parts of 90% alc. On fractionation a residue of 15% showed a drop in *n*, m. 7°, was devoid of sweetness, and had a woody, cedar-oil-like flavor. The nature of the adulterant has not been established. A. VORISEK.

Essential Oils and Allied Products during 1911. ANON. *Perf. Ess. Oil Record*, 2, 294.—A trade review. A. VORISEK.

Kefir and Yogurt. M. HOHENADEL. *Pharm. Zentralhalle*, 52, 1337–43, 1371–8, 1401–4.—The prep. and properties of the fermented milks are described and the products discussed from therapeutic standpoint. The use of yoghurt tablets is recommended. A. VORISEK.

Oil of Origanum hirtum. S. S. PICKLES. *J. C. S. Trans.*, 1911, 254; through *Perf. Ess. Oil Record*, 2, 280.—From the dry plants grown in Trieste 3.3% of a pale oil were obtained. Its d_{15} was 0.944, $[\alpha]_D$ +0° 24′, phenols (by NaOH) 66–67% by wt., 64.4% by vol.; sol. in 7% alc. 1 : 2.8 vol. The oil had a pronounced thymol odor, and its phenolic portion solidified completely on cooling. A. VORISEK.

The Adulteration of Otto of Roses. E. BONTCHEFF. *Perf. Ess. Oil Record*, 2, 292.—Continued, systematic adulteration of the natural product is alarmingly increasing. A distillate of *Andropogon nardus*, rich in geraniol, is being imported into Bulgaria for that purpose. A. VORISEK.

Color Reactions of Peppermint Oil. J. C. PARRY. *Perf. Ess. Oil Record*, 2, 215.—Heat 1 cc. of the oil with 0.5 g. of equal parts of paraformaldehyde and citric acid over a water bath: a pink color is produced which becomes reddish brown in 0.5 m. This reaction serves to distinguish the Japanese oil, which does not react, from all other peppermint oils. A. VORISEK.

English Rosemary Oil. J. C. UMNEY. *Perf. Ess. Oil Record*, 2, 274.—A rept. from the lab. of an English grower of rosemary shows the optical rotation of pure oils of rosemary distilled at different periods (1905–10–11). The 3 oils gave resp. +1.75°, +1.25°, +2.2°. A. VORISEK.

Duodecyl Aldehyde. J. C. UMNEY. *Perf. Ess. Oil Record*, 2, 276.—The claims that this aldehyde is necessary for the production of violet perfume is disproved. Used moderately, it serves to impart to many perfumes a shade of freshness. A. V.

Soluble Silver Oxide. T. W. SCHAEFER. *Boston Med. Surg. J.*, 1911, 92; through *Pharm. J.*, 87, 351.—AgOH is prepared by adding an EtOH soln. of KOH to an EtOH

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soln. of $AgNO_2$ at low temp., about 40°. About 1 g. of Ag_2O is sol. in 3 l. of dist. H_2O forming a perfectly transparent and quite stable soln. of AgOH. This soln. of AgOH has a strong metallic taste and is like TlOH, strongly alk., and ppts. from many metallic salts the oxides and hydroxides of the respective metals, while it decomposes easily a soln. of NaCl with formation of NaOH and insol. AgCl. One advantage over the ordinary salts of Ag, *e. g.*, $AgNO_3$, is that this prep. of sol. Ag does not contain a salt-forming acid. This form of an Ag prep. is suggested to those who have faith in the therapeutic efficiency of Ag in its various combinations. S. WALDBOTT.

Pomegranates. *Pure Products*, 7, 66–7; *Expt. Sta. Record*, 24, 763.—Data regarding the comp. and uses of pomegranate are summarized, particularly with reference to the making of pomegranate sirup which is commonly known as grenadine sirup. J. J. M.

The Pharmacology of Sulfur and its Compounds. WILD. *Merck's Rpt.*, 20, 61; *Expt. Sta. Record*, 25, 386.—A discussion in regard to the various uses of S in medicin. A comparison is made with other drugs used for some of the same purposes. J. J. M.

Estimation of Hydrastine in Hydrastis Extract. A. W. VAN DER HAAR. Utrecht. *Pharm. Weekblad*, 48, 1302–7; cf. *C. A.*, 5, 2897.—Criticism of paper by Meulenhoff (*C. A.*, 6, 410). A. admits method of Pharm. Ndl. IV not perfect but most useful. He gives method as follows, which he thinks all will agree avoids the errors pointed out: Mix 5 g. (better 10) with 20 cc. H_2O and boil till residue = 10–11 g.; add 4 cc. dil. HCl and boil; then add H_2O to 20 cc.; shake with 1 g. talc and filter. Put 10 g. filtrate in flask of 100 cc., add 7 cc. NH_4OH and 25 cc. ether and shake for 2 min.; add 25 cc. petroleum ether (b. p. 60–80°) shake 30 sec., add 2 g. tragacanth powder and place flask in cool place for 18-24 hrs. Pour off ether mixt., wash crystals with petroleum ether and dry on water bath. Weigh. V. E. HENDERSON.

Colorimetric Estimation of Salicylic Acid and Copper (SCHOTT). 7. Nitroglycerin as a Drug (WEINBERG). 11H.

U. S., 1,015,496, Jan. 23. J. KOETSCHET and A. BARBIER. **Making nitrophenylnitromethanes, their homologs and derivatives.**

U. S., 1,015,641, Jan. 23. E. SCHEITLIN. **Medicinal composition formed from blood and guaiacolsulfonic acid.**

U. S., 1,015,691, Jan. 23. J. KOETSCHET and A. BARBIER. **Making *o*-nitrophenylnitromethane.**

U. S., 1,015,857, Jan. 30. S. A. VASEY. **Preparing soluble protein from insoluble protein matter.**

U. S., 1,015,994, Jan. 30. W. CONNSTEIN. **Making fatty acids from their esters by the action of ferments.**

U. S., 1,016,092, Jan. 30. G. REINICKE. **Producing *ω*-*p*-alkyloxyphenylethylamines and their *N*-alkyl derivatives.**

U. S., 1,016,115, Jan. 30. H. WALLAND. **Rendering vegetable proteins soluble.**

U. S., 1,016,784, Feb. 6. H. SCHOTT. **Mercury compound obtained from mercuric oxide and sodium 1-phenyl-3-methyl-5-pyrazolone-*p*-sulfonate.**

U. S., 1,016,799, Feb. 6. J. L. TURNER. **Preparing iodoanhydromethylene protein.**

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18. ACIDS, ALKALIES, SALTS AND SUNDRIES.

T. LYNTON BRIGGS.

Sulfuric Acid Intensive Systems. T. MEYER. *Z. angew. Chem.*, 24, 1520. T. L. B.

The "Moritz" Acid Chambers. T. H. NORTON. *Chem. Trade J.*, 49, 493–4.—N. reviews the advantages of the Moritz acid chambers over the old systems. E. C. LATHROP.

The Opl System of Towers for the Production of Sulfuric Acid of 60° Bé. of the Ersten Oesterreichischer Sodafabrik, Hruschau. E. HARTMANN. *Z. angew. Chem.*, 24, 2302.—This process involves the use of towers entirely without chambers, some producing the acid according to the principles of the Glover tower and others serving as Gay-Lussacs to absorb the oxides of N necessary for the acid production. For instance, a system to produce 39,600 lbs. of 60° Bé. acid daily consists of 6 towers placed in series: 3 acid producers and 3 oxide absorbers. The first three only require a light cover, the others are open to the air, the whole covering an area of about 125 × 25 ft. Total cubical content of the 6 towers is about 16,800 cu. ft. or 0.42 cu. ft. to the lb. of 60° Bé. acid. The course of operations consists in transporting the acid leaving towers I, II, III, to the top of towers IV, V, VI, and *vice versa*, so that I and VI, II and V, III and IV communicate. The necessary H_2O is supplied by sprays in the tops of I, II, III and IV. The acid is raised by air-lift (Emulseur), the pipes supplying towers III, IV, V and VI being water-cooled. The acid formed in II, III, IV, V and VI collects in a mixing box, whence it is sent by the air-lift to the top of I, wherein it is conc. to 60° Bé. and all but traces of N compds. are removed. Thus the total production is obtained as 60° Bé. acid. The towers share the production of acid about as follows: I, 20%; II, 30%; III, 50%. Only traces of SO_2 leave tower III. Consumption of HNO_3 (36° Bé.) averages 0.75 per 100 of chamber acid. The gases are drawn through the system by a fan after VI and then forced through a coke box to remove any acid mist, to the atm. The cost of the installation under German conditions does not exceed $25,000–27,500. Power required for the fan is about 3 kw. per hr. The air-lifts require about 112,000 cu. ft. air to be compressed to 2.5 atm. and from 42,000 to 84,000 gallons of water for cooling, per day. A large number of German and other firms have adopted the system so that 10 to 12 are now in course of construction. T. LYNTON BRIGGS.

Alum. M. A. GAUTIER. *Rev. chim. ind.*, 22, 357. T. L. B.

Studies in the Manufacture of Minium. J. MILBAUER. Prague. *Chemické Listy*, 6, 6–12; cf. *C. A.*, 5, 1716.—In the manuf. of Pb_3O_4, the rate of the reaction can be increased with the use of air under high pressure. P. J. HANZLIK.

Report of the Committee on Chemical Engineering Education. F. W. FRERICHS. Am. Inst. Chem. Eng., *Bull.* Dec., 1910; *Trans. Am. Inst. Chem. Eng.*, 3, 122, 146. J. R. W.

Remarks on Chemical Engineering Education. F. W. FRERICHS. Am. Inst. Chem. Eng., *Bull.* Dec., 1910; *Trans. Am. Inst. Chem. Eng.*, 3, 151. J. R. W.

Teaching Industrial Chemistry. A. H. SABIN. Natl. Lead Co. Am. Inst. Chem. Eng., *Bull.* Dec., 1910; *Trans. Am. Inst. Chem. Eng.*, 3, 169. J. R. W.

The Four-year Course in Chemical Engineering. J. H. JAMES. Carnegie Tech. Schools, Pittsburg. Am. Inst. Chem. Eng., *Bull.* Oct., 1911. J. R. W.

The Question of Five-year Engineering Courses at Ohio State University. JAMES R. WITHROW. Am. Inst. Chem. Eng., *Bull.* Oct., 1911. J. R. W.

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Perkin Medal Award. Presentation Address. C. F. CHANDLER. **Address of Acceptance.** HERMAN FRASCH. **Geology of the Sulfur and Sulfur Oil Deposits of the Coastal Plain.** A. F. LUCAS. **Sulfur Mines of the Union Sulfur Company in Louisiana** (illus.). F. H. POUGH. *J. Ind. Eng. Chem.*, 4, 131–47; *Met. Chem. Eng.*, 10, 73–82. E. J. C.

Drying by means of Hot Air. H. S. KITTLE. *Chem. Trade J.*, 50, 77–8.—Hot air drying is at present but an empirical process. The general practice appears wasteful and is capable of much improvement. E. J. C.

Machine and Material Testing Institute. H. PUDOR. *Elektrochem. Z.*, 18, 251–4.—The work of the Royal Testing Lab. at Gross-Lichterfelde is discussed. This is a court of last resort for all manner of tests of com. materials. W. E. RUDER.

Innovations in Rectifying Apparatus for Regeneration of Alcohol, Ether, Etc., for Explosives, Tannin, and Dye Works and Silk Spinners, Etc. W. BÖCKENHAGEN. *Z. angew. Chem.*, 24, 2104; *Chem. Ztg.*, 35, 1240.—A dephlegmator built on the countercurrent system is placed directly upon the usual rectifying column. It is of rectangular form of greater length than width and relatively small height. The cooling water tubes pass through from one end to the other and connect with chambers on the outside for the circulation of the water. The vapors rizing from the column pass over the outside of the cooling tubes, are freely condensed there and the following vapors passing through this condensate are thereby very thoroughly strengthened. Economy of steam used and about $^1/_3$ of column height is claimed. Small drawing given. T. LYNTON BRIGGS.

Lime (HASKINS, MERRILL). 15.

U. S., 1,015,286, Jan. 23. F. BERGIUS. **Making alkaline earth peroxides.**

U. S., 1,015,345, Jan. 23. C. ROLLIN. **Making amorphous anhydrous barium hydroxide.**

U. S., 1,015,499, Jan. 23. N. A. LANGLET and E. L. RINMAN. **Making pulverulent and easily washable hydrates of aluminium.**

U. S., 1,015,554, Jan. 23. J. W. GEBHARD. **Paste for hardening steel castings.**

U. S., 1,015,566, Jan. 23. G. KASZNER. **Separating oxygen and nitrogen from the atmosphere.**

U. S., 1,015,601, Jan. 23. R. L. WATKINS. **Package for preserving and mailing microscopical specimens.**

U. S., 1,015,701, Jan. 23. G. A. H. MULLER. **Luminous sticky mixture for entrapping insects.**

U. S., 1,015,707, Jan. 23. S. PEACOCK. **Making phosphorus trioxide.**

U. S., 1,015,800, Jan. 30. E. JÄNECKE. **Liquefying air and separating it into its constituents.**

U. S., 1,015,920, Jan. 30. F. C. WINKLER. **Antifriction-bearing composition** containing graphite and $MgCO_3$ cement.

U. S., 1,016,239, Jan. 30. N. WRINKLE and R. G. PADDOCK. **Obtaining sodium carbonate from a solution containing also chloride, sulfate, bicarbonate and other salts and organic matter.**

U. S., 1,016,476, Feb. 6. F. G. COTTRELL. **Purifying the gases going to the contact mass in making sulfur trioxide.**

U. S., 1,016,526, Feb. 6. O. SERPEK. **Purifying impure aluminous materials and producing nitrogen compounds.**

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Can., 127,540, Dec. 26, 1911. I. J. Cox. Mfg. oleum by causing H_2SO_4 to absorb SO_3 at a temp. between 95° and 115° F.

Can., 137,541, Dec. 26, 1911. W. A. Phillips. Method of obtaining oxides of nitrogen. A hydrocarbon flame is spread over a plate and a mixt. of N and O allowed to travel over the spread-out flame at a speed greater than the speed of the hot gases in the flame.

Can., 137,990, Jan. 23, 1912. A. Beltzer. Method of and substance for use in generating oxygen consisting in heating a pulverulent mixt. of not more than 66% of $Ca(ClO)_2$ and not less than 33% of $Ca_2(OH)_2$.

Ger., 230,085, Nov. 5, 1909. E. Abresch and L. Montag. Filter with elastic filtering material. The liquid to be filtered is absorbed by the filtering material and this is then passed between rollers, the liquid being thereby expelled, and the process repeated.

Ger., 230,499, Sept. 9, 1908. Pintsch Akt.-Ges., Berlin. Water seal at the base of vertical retorts or chambers. The shaft bearing the water trap is hollow, serving as a water conduit. Details are specified.

Ger., 230,627, Jan. 25, 1910. Gaspari & Co. Washing sand, gravel, and the like, in a closed drum, by means of a counter current.

Ger., 230,817, Mar. 25, 1909. J. Wassen. Sifting drum.

19. GLASS AND CERAMICS.

G. E. BARTON, A. V. BLEININGER.

Improved Construction in Machines for the Cutting and Polishing of Plate Glass. Anon. *Diamant*, 33, 1183–4; 34, 3–4 (8 figs.). J. B. Patch.

Inside Gutters for Glass Roofs. Anon. *Diamant*, 33, 1147. 5 figs.—Grooves are cut upon the under surface of the glass which collect the condensed moisture, for a conservatory for example, and deliver it into a system of small gutters thus avoiding all dripping. J. B. Patch.

Flattening Ovens. Anon. *Sprechsaal*, 44, 712–3. G. E. Barton.

Pot Furnaces on Tank Furnaces? Anon. *Sprechsaal*, 44, 745–6. G. E. B.

Plasticity, Especially of Barium Sulfate. P. Ehrenberg. *Zt angew. Chem.*, 24, 1957.—Review of literature, giving various contending views as to causes of plasticity. Bibliography. J. S. Goldbaum.

Pottery Progress in 1911. H. H. Stephenson. *Chem. Trade J.*, 50, 78–9. E. J. C.

U. S., 1,015,537, Jan. 23. C. E. Blue. Apparatus for charging glass molds.

U. S., 1,015,538, Jan. 23. *Idem.* Apparatus for manufacture of glass.

U. S., 1,016,345, Feb. 6. A. Malinovszky. Brick formed from silica, lime and pegmatite.

U. S., 1,016,350, Feb. 6. W. N. McKnight and R. H. Youngman. Refractory brick for metallurgical furnaces.

Ger., 229,624, Feb. 6, 1910. J. Wald. Mounting glass plates on supporting plates.

Ger., 230,145, Mar. 2, 1910. G. H. Baillie. Furnaces for heating tilting pots in glass manufacture. Nozzles are used alternately for the intake of the heating

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gas and the exhaust, in order to avoid accumulations of soot and the contamination of the charge thereby.

Ger., 230,944, Nov. 1, 1908. M. A. GUILLEMOT. **Automatic glass-blowing machine.** The glass body, formed in a reversible filling mold and in a head mold, is finished in a preliminary blowing mold, a finishing mold, and a device for turning the bottom, so that the article can be shaped successively from the filling mold, reversed and suspended to the head mold, in the 3 other molds.

Ger., 230,999, May 7, 1909. A. WILZIN. **Device for blowing glass bottles.** Details of construction are specified.

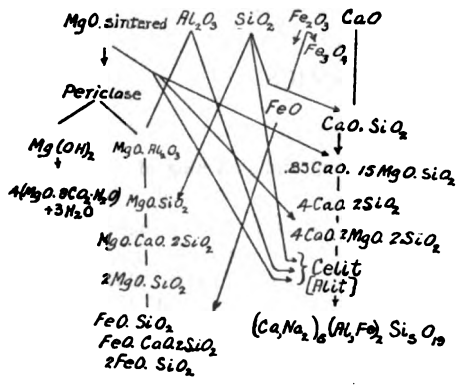
20. CEMENT AND OTHER BUILDING MATERIALS.

C. N. WILEY.

Magnesia in Cement. A. MOYE. *Zement u. Beton*, 10, 426; *Z. angew. Chem.*, 24, 1983.—Review of the work of Jesser, Dykerhoff, Cornu, Muirhead and Vogt.

A. J. PHILLIPS.

Influence of Magnesia on Cement. L. JESSER. *Zentr. hydraul. Zement*, 1, 41–4.—Dykerhoff considers 5% the max. amt. permissible when not present as silicate. Sintering favors the change of amorphous MgO to periclase. MgO forms spinel and is a regular constituent of melts containing large amts. of MgO and Al_2O_3. Diatomaceous earth and dolomite in proportions to form monticellite ($MgO.CaO.SiO_2$) were sintered and the product consisted of free CaO and Ca forsterite. Monticellite crystallized out of the totally melted mass showing that temp. is an important factor. Expts. by Muirhead and Vogt show that, in very basic silicate melts where proportion of SiO_2–Al_2O_3 = or <2.1, the addition of a corresponding amt. of MgO causes the sepn. of spinel. Jesser rejects the possibility of formation of Ca aluminate and considers that the MgO forms spinel which may dissolve in the alit.



A. J. PHILLIPS.

The Adulteration of Portland Cement. R. C. CARPENTER. *Eng. News*, 67, 94–5.—A brief résumé of the effects of adulterating materials upon the quality of cement. Instances are cited showing where great improvement in the cement has resulted from the use of such inert materials as clay, slaked lime, sand, ashes, natural cement, or tufa.

H. M. PLUM.

Wood Block Pavements in Chicago. J. ERICSON. *Eng. Record*, 65, 10.—As a result of the exam. of wood paving for buckling and exudation of preservative caused by presence of excessive quantities of heavy tar oil, E. recommends that the present specifications calling for an oil of d. 1.10–1.13 be discarded and the adoption of the following spec. which were prepared by the U. S. Forest Prod. Lab. The oil shall be derived from coal gas or coke-oven tar without any admixt. whatsoever, liquid at 38° and not more than 3% of the water-free oil to be insol. in $CHCl_3$ or benzole. D_{38} = 1.03–1.08. On distillation less than 5% up to 210°, less than 25° up to 235°, and less than 35% up to 355°. The distillate between 210–235° on cooling to 25°

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must yield solids. Detailed instructions for distillation are given and the oil must not contain over 3% H_2O (cf. *C. A.*, 5, 3510). A. J. PHILLIPS.

Bituminous Compounds in Macadam and Earth Road Construction. T. R. AGG. *Eng. News*, 65, 253–4.—Expts. by the Illinois Highway Commission have shown that a poured or tar macadam makes a desirable roadway with less dust than the untreated macadam. The oiled-earth construction is of doubtful value. A. discusses the proper road bed, the character of the tars used, and the best means of applying them. A table is added showing the analyses of the tars used. H. M. PLUM.

Highway Construction and Maintenance in Massachusetts. ANON. *Eng. Record*, 65, 66–7.—Chem. analysis of oils and bitumens show wide variations in lots purporting to be of the same material. A variation in viscosity from 390–590 in one brand, and 240–390 in another was noted. The difference in wearing quality of the roadway may be in part due to this variation. E. BARTOW.

Waterproofing Sewers. 14. Electrolytic Disintegration of Concrete Structures (HEYM). 4. Lime (HASKINS, MERRILL). 15.

U. S., 1,015,365, Jan. 23. W. A. WEELANDS and E. WILLIAMS. **Size for walls.**

U. S., 1,015,426, Jan. 23. G. S. DONAHEY. **Forming fireproof and waterproof articles** from coal clay, coal shale, sand and crude petroleum.

U. S., 1,015,862, Jan. 30. W. J. WATSON. **Preserving wood with iron carbonate and carbon dioxide solution.**

U. S., 1,016,024, Jan. 30. E. MARMETSCHKE. **Preserving wood by treatment with zinc chloride and aluminium sulfate.**

U. S., 1,016,111, Jan. 30. E. SUCHER. **Preserving and hardening wood.**

Ger., 230,111, Oct. 29, 1909. SUDENBURGER MASCHINENFABRIK U. EISENGIESSEREI AKT.-GES. **Lime-slaking app.** with cylinders suspended in the reservoir for the liquid and bearing conveyor worms.

Ger., 230,527, Jan. 12, 1910. R. WUNDERLICH. In the manuf. of **mortar,** the product is rendered quite impervious to water by satg. the constituents of the mixt., such as pumice-stone, granulated slag, ashes, and crushed bricks, with soap solns., and then drying.

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21. FUELS, GAS AND COKE.

J. D. PENNOCK.

Uses of Peat for Fuel and other Purposes. C. A. DAVIS. Dept. of Interior, Bur. of Mines, *Bull.* 16.—Peat is available for EtOH, NH_4 compds. by the Frank-Caro process, and the Woltereck process, nitrates by the Muntz & Laine method, dyestuffs, material for tanning, paper, woven fabrics, artificial wood, mattresses and sanitary appliances. But it can hardly be classed as a satisfactory raw material for making any of the more complicated products under the usual conditions existing in the U. S., where other and established substances are already to be had in any desired quantity and at satisfactory prices. Peat land may be cultivated with profit if the right crops are chosen and the peat is sufficiently drained, decomposed and fertilized. Poorly decomposed peat may be very profitably used on farms to increase the fertility, and add to the productiveness indirectly by conserving humus and moisture.

C. A. COLE.

Production and Uses of Lamp Black. B. B. BUTLER. *Min. Eng. World*, Oct.

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28, 1911; *J. Soc. Chem. Ind.*, 30, 1302.—At Cabot's lamp black plant at Grantsville, W. Va., the open ring method of manuf. is used, though the waste is greater than in any other. The "rings" in which the black is produced are 60 ft. in circumference, and near the top of the ring is a flat, smooth Fe plate entirely covering the ring. The black is made by impinging the burning natural gas jet upon the surface of the plate, which is kept constantly revolving. Against the plate is arranged an automatic scraper which removes the black produced. By means of screw conveyors the black is conveyed from the scraper to a large bin, where it is ground, sifted, and bolted, and all foreign matter eliminated. The better part is elevated to a packer bin, while the waste is carried off. At least $^1/_4$ of the gas burned, and probably $^1/_3$, is wasted, in the form of lamp black carried through the vents in the rings by the heat. A dense cloud of black smoke arizes from the plant and hovers over it. J. J. M.

Coals Available for the Manufacture of Illuminating Gas. A. H. WHITE AND P. BARKER. Dept. Interior, Bur. of Mines, *Bull.* 6.—There are a few well developed coal fields in the country that furnish coal satisfying all the requirements of gas manuf. Most of the coal used hitherto has come from western Pa. The investigations were so directed as to permit the testing of coals from different parts of the U. S. The results show that certain coals from which good yields of gas had been expected cannot be considered as available for illuminating gas manuf. Data is given showing the progress of distillation by $^1/_2$-hr. intervals for each coal, also the temps. inside and outside the retort, the c. p. and heating value of the gas and the variation in the % of "illuminates," H and C_2H_4. The total yields of tar and NH_3 liquor are shown by chart at $^1/_2$-hr. intervals; also the yield of NH_3 and wt. of $C_{10}H_8$ vaporized in the gas and dissolved in the tar at the outlet of the tar separator. C. A. COLE.

Copper Compounds of Acetylene. W. MANCHOT. *Oesterr. Chem. Zig.*, 14, 264-5 (1911); *J. Soc. Chem. Ind.*, 30, 1302.—Solns., constant in their content of Cu_2Cl_2, but varying in their content of HCl, were found to absorb greater quantities of C_2H_2 as the content of NCl diminished, up to a max., after which further diminution of the HCl lessened the amt. of absorbed C_2H_2. The compd., C_2H_2CuCl, is formed in this case. If the Cu conc. is increased, the compd., C_2H_22CuCl, is produced; not, however, by direct addition of Cu, but by dissociation of the first compd.—2 (C_2H_2CuCl) = C_2H_2, 2 CuCl + C_2H_2. Similar results were obtained with phenylacetylene and other substituted acetylenes but not with diacetylenes such as $C_6H_5C \vdots CC \vdots CC_6H_5$, which form no addition compds. with Cu salts. The power of forming addition compds. depends on the nature of the substituting radicles. J. J. M.

Essential Factors in the Formation of Producer Gas. J. K. CLEMENT, L. H. ADAMS, AND C. N. HASKINS. U. S. Dept. Interior, Bur. Mines, *Bull.* 7, 5-57.—*The rate of formation of CO at high temps.* (see *C. A.*, 3, 2747). It is pointed out in addition that from a consideration of the temp. coeffs. of the equil. const. *K* it is probable that velocity of chem. combination and not diffusion is the detg. factor in the speed of the reaction. *Effective temps. for water-gas generation.* Lab. expts. by Clement and Adams (most thorough and complete yet published) were conducted using coke or charcoal as in the work on CO. Charcoal reacts much more rapidly with water vapor than coke. CH_4 was formed in practically every case, usually to the extent of 2% on dry gas basis. This indicates that not all the CH_4 of producer gas results from destructive distillation of the fuel but a portion arizes from the action of steam on C. Many graphs are given illustrating the exptl. results on the relation of yield and comp. of gas to temp. and time of contact. Equil. conditions in the 4 main possible reactions during water-gas production are discussed. In applying the results to gas-producer practice it is seen that in the reaction between steam and C if the time of contact is $^1/_4$ sec., 8% of water vapor is decomposed at 1,100°; 15% at 1,200°; 32% at 1,300°, and about 60% at 1,400°.

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Each 100° rise doubles the % water vapor decomp. between 1,100° and 1,400° for a given gas velocity. The same decomp. secured at 1,170° with a gas velocity of 0.5 ft. per sec. is secured at 1,300° with a velocity of 2 ft. per sec. Since the yield, therefore, depends on 2 factors, temp. and velocity or time of contact, high capacity and high % of fixed gases formed, require high temp. and deep fuel bed, or the same conditions as found best for high yields of CO from CO_2 and C. When much steam is used the efficiency of the producer falls and the CO_2 produced increases. This work indicates that this is probably due to a slowing down of the reaction $CO_2 + C = 2\ CO$, due to temp. depression. Much steam must, therefore, be avoided. Where steam vol. is necessary to prevent clinkering slagging off the clinker as in blast furnace practice is suggested to avoid use of steam and maintain high temp. Fuel bed temp. above 1,500° by using a hot blast would give a capacity many times greater than current practice. In applying the results to water-gas generation it is seen that for high rates of steam supply a temp. above 1,300° is necessary. The highest efficiency will be obtained by raising the temp. of the bed during blast as high as is possible without injury to the producer. As the bed cools during steam introduction, the steam should be gradually throttled and when the temp. has fallen to 1000° should be shut off entirely. J. R. WITHROW.

Burkheiser Process. GLASGOW GAS COMMITTEE. *J. Gas Lighting*, 116, 750.—The report concludes as follows: "The dry oxide process, seemed to offer advantages in the work of gas purification which were well worth inquiry and consideration. In view, however, of the new or wet oxide process which is now under trial, the sub-committee recommend that it is not advizable to instal Burkheiser plants until further experience has been gained, and that all the information available regarding further tests of the process should be obtained, as it is probable it will have much influence on the purification of the near future." C. A. COLE.

Coke and Gas Manufacture in Belgium. *J. Gas Lighting*, 116, 775.—To meet the growing home demand for metallurgical coke, improvements have been decided upon or carried out in Belgium which it is estimated will increase the production to the extent of about 900,000 tons. C. A. C.

Coal Gas Purification. H. E. STONE. *J. Gas Lighting*, 116, 761–5.—Various methods of purification were discussed, including the use of Fe_2O_3, lime, the Feld and Burkheiser processes, and the so-called liquid purification process. C. A. C.

The Liming of Coal in Gas Manufacture. J. PATTERSON. Cheltenham. *J. Gas Lighting*, 116, 449–53.—"The method was revived at Cheltenham in 1910, the liming being applied by a special method and the results have been very successful. About 2% of lime is used, 75% of which is sold with the coke. The quality of the coke is in no way impaired. Up to December, 1910, the gas yield had been increased 829 ft., through the ability to carry higher temps. without stopped up-take pipes, and the sulfate recovery had been increased 1.9 lbs. over the figure for 7 yrs. previous. Tar was about 0.9 gallons less. No deterioration of the linings could be observed. In the 6 months ending June, 1911, the results were still better, the improved NH_3 yield being maintained and the gas yield being increased 160 ft. further. The S in the gas was only 20.5 grains per 100 ft." C. A. C.

Liming of Coal. C. C. BARBERC. Addelry Street Gas Works. *J. Gas Lighting*, 116, 765; cf. preceding abstr.—"A reduction of about 65% of the S compds. was secured by adding 2% of slaked lime to the coal. Stopped pipes were decreased very materially. Before lime was added they averaged 10 stopped pipes per day and this number was reduced to 2. There was practically no effect on the coke. The yield of ammoniacal liquor was increased by about 11%. The H_2S in the crude gas was decreased, prob-

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ably by decomp. of S compds. by 0.2% or 0.3%. The $(CN)_2$ content of the gas was doubled." C. A. C.

Use of High Pressure Gas for Melting Metal (SMITH). 9. Formation of Coal Beds (STEVENSON). 8. Determination of Sulfur (SAVIRON). 7.

U. S., 1,015,296, Jan. 23. W. B. CHAPMAN. **Gas producer.**

U. S., 1,015,353, Jan. 23. H. A. SMITH. **Gas purifier.**

U. S., 1,015,549, Jan. 23. H. FOERSTERLING. **Apparatus for continuous production of producer gas and steam.**

U. S., 1,015,550, Jan. 23. *Idem.* **Method of continuous generation of producer gas, steam and power.**

U. S., 1,015,632, Jan. 23. S. N. NORTH. **Apparatus for generating gas from liquid fuel.**

U. S., 1,015,964, Jan. 30. J. G. KROS. **Regenerative coke oven.**

U. S., 1,016,133, Jan. 30. T. F. FITZSIMMONS. **Gas producer.**

U. S., 1,016,290, Feb. 6. R. ROBINSON. **Gas purifier.**

Ger., 229,604, Oct. 22, 1908. K. MAXANER. App. for **recovering coal dust in coal washing and sooting plants.**

Ger., 230,583, Feb. 9, 1909. G. RECKLING. In a **coking process,** drawing off and consuming the gases given off while filling, opening up, and emptying coke chambers. The app. is provided with fireproof lining and interiorly maintained at such a temp. that the combustion of the gases, previously mixed with air, is ensured.

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22. PETROLEUM, ASPHALT, COAL TAR AND WOOD PRODUCTS.

R. E. HUMPHREYS.

Influence of Selenium in the Refining of Petroleum. F. SCHULZ. Prague. *Chem. Ztg.*, **35**, 1129–30.—Presence of H_2SeO_3 in the H_2SO_4 used in refining of petroleum causes the oil to assume a yellow color which is not removable by subsequent treatment with pure H_2SO_4. H_2SO_4 containing over 0.005% SeO_2 turns black when shaken with refined petroleum. This is suggested as a test for Se, although N_2O_3 and N_2O_5 have the same effect. The discoloration of the petroleum is probably due entirely to direct oxidation, the SeO_2 being reduced to Se and ppts. out. No Se was found in the yellow petroleum. V. NUNEZ.

Note on the Examination of Finnish Turpentine. L. M. NASH. *Analyst*, **36**, 577.—A sample of Finnish turpentine was found to flash at 67° F. instead of 90–100° F. After washing with 100 cc. water it flashed at 90–100° F. The wash water was fractionated and the distillate after removal of water was identified as CH_3OH. It amtd. to about 0.5%. Although CH_3OH is insol. in turpentine, it is probable that other substances present in minute quantities hold it in soln. in the turpentine. The danger of reporting a turpentine having a low flash point as adulterated with light petroleum-spirit or benzene is pointed out. P. B. DUNBAR.

Wood Block Pavements (ERICSON). 20. Bituminous Compounds in Road Construction (AGG). 20.

U. S., 1,015,519, Jan. 23. R. STROBACH. **Obtaining acid-free tar and tar-free pyroligneous acid vapors in distilling wood.**

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U. S., 1,015,662, Jan. 23. C. A. BENKENDORF. **Apparatus for purifying fuel gasoline.**

U. S., 1,016,801, Feb. 6. L. S. VAN WESTRUM. **Coating composition containing asphalt and oils.**

23. CELLULOSE AND PAPER.

A. D. LITTLE.

Paper Pulp from Eucalyptus. ANON. *Paper Making*, 30, 376; *J. Soc. Chem. Ind.*, 30, 1248.—Samples of pulp of excellent quality have been prepared from the eucalyptus (blue gum), which has been planted over large areas in southern California. The pulp is strong, clean and slightly reddish, owing to the action of the alkali. Expts. with this wood as a raw material for paper pulp leave no doubt as to its suitability for the purpose. A sufficient growth of blue gum may be obtained in 4–6 yrs.; the stump yields a further good growth 3 yrs. after cutting. J. J. M.

Waste Water from Sulfite Mills. J. H. VOGEL. Berlin. *Papier Ztg.*, 35, 1547–8. —Different sulfite mill wastes should be treated as follows: (1) The cooking liquor evapd., mixed with coal and burned; (2) the remaining waste settled in outside basins and then filtered sufficiently well so that it can be reused in the mill; (3) some of the wastes may be used for irrigation; (4) the white water waste purified by sedimentation in baffled settling basins. F. E. GALLAGHER.

Fraud in the Weight of Merchandise. A. BERNIN. *Ann. fals.*, 4, 581.—A protest against a certain kind of paper in general use in France, which is weighted with $CaSO_4$ and $CaCO_3$ and readily absorbs much moisture. Analyses of 19 such papers are given. A. W. BROOMELL.

U. S., 1,015,803, Jan. 30. W. H. JUDSON. **Pulp-making machine.**

U. S., 1,016,178, Jan. 30. (Dedicated to the public.) C. F. SAMMET and J. L. MERRILL. **Separating fibers such as cellulose from materials containing them.**

U. S., 1,016,844, Feb. 6. A. MOONELIS. **Paper made from tobacco fiber and extract.**

Ger., 230,852, Mar. 2, 1910. FR. PFEFFER. App. for **separating paper pulp from water**, whereby the wet stock is thrown by blades against a number of elastic sieves which recoil and close automatically at once in order to retain the pulp.

Ger., 230,868, Sept. 3, 1907. A. LANNOYE. In an app. for **working up paper waste** and the like, the material is treated with water and pulped by means of a fly wheel in an ante-chamber, this pulping treatment being repeated in a 2nd chamber with the admission, under control, of back water.

24. EXPLOSIVES.

C. E. MUNROE.

Initial Detonation. L. WÖHLER. *Z. angew. Chem.*, 24, 2089–99; cf. *C. A.*, 6, 546.—An extensive and excellent treatise discussing, in general, the action and efficiency of the fulminates and the metallic nitrides as detonating agents, and methods used for detg. their rate of detonation and sensitiveness. 0.02 g. Ag nitride is more efficient in detonating trinitrotoluene than is 0.25 g. Hg fulminate or 0.15 g. Ag fulminate. The nitrides are much more brisant and have greater velocity of detonation than the fulminates. Pb nitride is especially remarkable for its non-sensitiveness to blows

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or high temps. and to the effects of moisture, thus possessing many advantages over the fulminates. It can be readily prepared from the corresponding Na salt. The latter has only slight explosive properties, and, in fact, can hardly be classed as an explosive. A slight superficial decomp. of the nitrides results from exposure to sunlight, the surface becoming darkened by a metallic deposit. C. G. STORM.

Stability of Different Kinds of Smokeless Powder toward Ultraviolet Rays. D. BERTHELOT AND H. GAUDECHON. *Compt. rend.*, 153, 1220–3.—The samples were placed over Hg in atms. of CO_2 and N enclosed in quartz tubes and exposed to rays from a quartz Hg lamp at controlled temps. much below those temps. at which other portions of the same samples evolved gas. A tabular presentation of results with 10 different kinds of powder is given. All samples gave CO, CO_2 and N and all but the French Service powder, "B", gave N_2O_2, the powders containing nitroglycerin, such as M. D. cordite, yielding the most. C. E. MUNROE.

Explosion of the Contents of a Nitrating Centrifugal in the Royal Powder Factory at Ingolstadt. ANON. *Chem. Ztg.*, 35, 1440.—As a nitrated guncotton charge was being transferred from a centrifuge to a drowning tank, the portion in the centrifuge (about 7 kg.), exploded with flame and a loud report. Decomp. of the wrung-out charge is not unusual, but is generally only a rapid "fuming-off," without flame or explosion. It results from drops of dil. acid falling from the cover or fume pipe onto the wrung charge, or from the presence of hard lumps of cotton which resist the action of the acid until the high centrifugal force causes penetration of the latter to the dry interior of the lump. In either event there is a local heating of the charge, which may result in a rapid-spreading decomp. In this particular case the charge had been wrung at high speed for an unusual length of time and it is supposed that the dryness of the charge allowed the local decomp. to spread with explosive violence. No similar case of explosion has been recorded. C. G. STORM.

Influence of the Ratio of Glycerol to Nitric Acid on Yield and Economy in the Manufacture of Nitroglycerin. FRANZ HOFWIMMER. *Chem. Ztg.*, 35, 1229–30.—A series of 11 experimental nitrations were made in the Schlegel app. in order to det. the conditions for the highest yield and greatest economy in manuf. of nitroglycerin from a definit nitrating acid. The acid contained 52.5% H_2SO_4, 46.5% HNO_3, 1% H_2O. 110 g. glycerol were used in each expt., the amt. of acid being so varied that theoretically 5% less HNO_3 would be consumed in each succeeding nitration. No after-sepn. was obtained until the proportion of acid was increased to 5.5 times the glycerols, although considerable amts. of glycerol nitrates were dissolved in the spent acid. As the proportion of acid increased over this amt. the sepn. increased, while the acid-sol. nitrates decreased. The max. of economy does not correspond with the conditions giving max. yield of nitroglycerin. For the highest possible esterification an amt. of nitrating acid must be used which produces too much loss of dissolved nitroglycerin. A table and 2 sets of curves show all results. It would be of value in factory work to det. by such expts. the conditions for max. yield and economy with the acid mixt. used. C. G. S.

Hand Grenades in the Russian-Japanese War. ANON. *Russ. Eng. J.*; *Z. ges. Schiess-Sprengstoffw.*, 6, 433–4.—A description of various types of grenades used by both the Russians and Japanese. C. G. S.

Explosion at Works of Cotton Powder Co., Ltd., near Faversham, June 8, 1911. A. COOPER-KEY. *Spl. rept. H. M. I. Explosives*, 199.—Explosion of a detonating mixt. of $HgC_2N_2O_2$, $KClO_3$ and guncotton dust, thought to be due to static electricity. C. E. MUNROE.

Explosion at Factory of Curtis & Harvey, Kent, England, July 26, 1911. A.

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COOPER-KEY. *Spl. rept. H. M. I. Explosives*, C. C.—There were explosions of nitroglycerin and of partly manufactured cordite, thought to have been caused by friction or impact of a bogie on guncotton dust or thin "jelly" accidentally spilled from a rent rubber bag. Several recommendations are made in consequence of this investigation. C. E. M.

Explosion at Works of Kynock, Ltd., near Arklow, Wicklow Co., Aug. 4, 1911. H. CONINGHAM. *Spl. rept. H. M. I. Explosives*, C. C. I.—The jury found the injuries to be "caused by the explosion of arkite and rein gelignite resulting from the impact, while being conveyed on a bogie, of a box or boxes containing these explosives, with some hard substance." C. E. M.

Causes and Prevention of Coal Mine Explosions. E. K. JUDD. *School Mines Quart.*, 33, 65.—General in treatment. C. E. M.

Report Chief of Ordinance, U. S. N., 1911. N. C. TWINING.—The stabilizer now incorporated in the U. S. N. smokeless powder not only acts as such but is an efficient and automatic detector of irregularities in manuf. Exptl. firings of the smokeless powder with ozocerite and graphite to reduce erosion have not yet shown conclusive results. In spite of the increased cost of cotton through the installation of new machinery at Indian Head the cost of production of smokeless powder has been reduced. Magazine cooling is not to be made universal on our ships. C. E. M.

Nitroglycerin as a Drug and Nitroglycerin Poisoning (WEINBERG). 11H.

U. S., 1,015,814, Jan. 30. H. MAXIM. **Explosive charge for ordinance mixed with separate grains of cooling material.**

U. S., 1,016,368, Feb. 6. E. SCHNEIDER. **Fuse for explosive projectils.**

U. S., 1,016,373, Feb. 6. R. SOHLMAN, H. NORDENFELT and H. MOREN. **Fuse for high explosive shells.**

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25. DYES AND TEXTIL CHEMISTRY.

L. A. OLNEY.

The Present Position of Natural Indigo. G. TURNBULL. *Chem. Trade J.*, 50, 69. E. J. C.

Salicylic Acid Azo Dyes. EUG. GRANDMOUGIN. Mülhausen i/E. *Ber.*, 44, 3756.—*p*-Aminoanilineazosalicylic acid and its Ac deriv. described by C. Bülow (*C. A.*, 5, 1780) have been prepared by the same method by Grandmougin and Guisan (*C. A.*, 2, 2997) and the first compd. by Meldola (*J. Chem. Soc.*, 47, 667 (1885)) from *p*-nitrobenzeneazosalicylic acid and $(NH_4)_2S$. Both compds. are described in Ger. Pats. 42,011 and 46,737. J. BISHOP TINGLE.

Fur Dyeing. ERICH SCHLOTTHAUER. *Färber. Ztg.*, 22, 397–400.—Certain preliminary treatments that have no real tanning effect but rather a preserving influence on the skin preceded the dyeing. Five such treatments are in use: with H_2SO_4 and salt, alum, chrome salts, bran- and chamois-dressing. The temp. at which the skin begins to shrink in the dye bath, thereby becoming worthless, is largely detd. by the preliminary treatment chosen; the chamois-dressed skins show the greatest resistance to heat. The temp. of the dye bath should not exceed 40–5°. Leaching out of the tanning matter in the dye bath can be considerably counteracted by a secondary treatment with a 1–2% CH_2O soln. applied to the skin after the preliminary treatment.

A. S. HALLAND.

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Microscopic Investigation of Wool and Artificial Wool. D. INGERMAN. *Pharm. Weekblad*, 48, 1380–4. V. E. HENDERSON.

Alteration of Dyes in Light (GEBHARD). 5. Qualitative Tests for Tannins (SCHNEIDER, SEIWERTH). 29.

U. S., 1,015,329, Jan. 23. R. MAAG. **Yellow vat dye**, benzoquinonedi-*p*-bromoanilide, $C_6H_2O_2(NHC_6H_4Br)_2$.

U. S., 1,015,354, Jan. 23. O. SOHST. **Blue dye**, a trisulfonic acid of the safranin series.

U. S., 1,015,375, Jan. 23. A. ZART. **Azo dye** containing a 2-arylcarbonylamino-5-naphthol-7-sulfonic acid radical.

U. S., 1,015,495, Jan. 23. J. KOETSCHET and A. BARBIER. **Making indigo-o-nitrophenyllactic acid ketones.**

U. S., 1,016,307, Feb. 6. H. WAGNER and J. ERBER. **Monoazo dye obtained from 1-diazonaphthalene-2-sulfonic acid and 2-naphthol-3-carboxylic acid.**

U. S., 1,016,604, Feb. 6. O. BALLY. **Dye obtained from 4,4′-dichlorobenzophenone and 1-aminoanthraquinone.**

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26. PIGMENTS, RESINS, VARNISHES AND INDIA RUBBER.

A. H. SABIN, DAVID SPENCE.

A New Kind of Varnish. L. CLÉMENT AND C. RIVIÈRE. *Caoutchouc & Gutta-percha*, 8, 5615.—Cellulose acetate dissolved in tetrachloroethane is not inflammable or hygroscopic. Price of solvent less than 1 franc per kg. in France ($1.00 per U. S. gal.). Camphor, alc., etc., may be added. A. H. SABIN.

Pure Linseed Oil. E. J. SHEPPARD. *J. Ind. Eng. Chem.*, 4, 14.—Oil pressed from clean hand-picked seed is not different from com. pure oil; green color from non-oleaginous impurities: I no. slightly affected, color not, by oleaginous impurities; extracted oil has same I no. as pressed oil; aging seed $2^1/_2$ yrs. in closed container does not affect the oil. Wt. per seed of N. American and N. Russian seed less than from warmer regions. Numerous new figures, and description of lab. oil-press. A. H. S.

The Production of Balsam of Peru. ANON. *J. Roy. Soc. Arts*, 60, 228. E. J. C.

Analysis of Vulcanized Rubber by Bromine Method. W. ESCH. *Gummi-Markt*, 5, 425; *Chem. Ztg.*, 35, 971.—Using Habener's method, results of analyses of 24 samples varied from —7% to +24%. The combined S is not converted quantitatively to the bromosulfide, and even when same is weighed and S and Br contained therein estimated, quite erroneous results ensue. L. J. PLUMB.

Synthetic Rubber. P. SILBERRAD. *Gummi Ztg.*, 25, 1959.—S. discusses methods of making isoprene. He claims advantages for his methods of depolymerization *in vacuo* or under low pressure, upon the grounds that 1 mol. of turpentine equals 2 mols. of isoprene, and this prevents the reversion of the latter to dipentene. Possible com. uses for the by-products are discussed. L. J. P.

Large Yield of Rubber from Hevea brasiliensis. R. H. LOCK AND M. K. BAMBER. *India Rubber J.*, 42, 653–5.—Results of tapping expts. on a 22 yr. old Hevea tree at Heneratgoda. It had never been tapped previously. The total yield for 600 tappings (V system) was 174 lbs. of dry rubber in 25 months,

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tapping at an av. interval of 1.3 days and removing about $^1/_{16}$ of an inch of bark each time. No close connection between yield and rainfall is shown, whereas a definit relation appears to exist between rainfall and conc. The seasonal variations are very irregular, but there is some indication of an increased yield towards the end of the year. The authors calculate that yield of latex was at least 18 times the vol. of the latex tubes in the bark removed and that the quantity of rubber removed in 1 yr. was greater than could be contained at any one time in the laticiferous system. D. SPENCE.

Rubber Plants of Northern Madagascar. ANON. *Bull. Imp. Inst.*; through *Gummi Ztg.*, 26, 454.—List of rubber-yielding plants. D. S.

Rubber in Northern Nigeria. ANON. *Agronomie Tropicale;* through *Gummi Ztg.*, 26, 499.—Most important species of rubber plants in this country are: *Funtumia elastica*, and various kinds of *Landolphia*, *Carpodinus* and *Clitandra*. *Landolphia owariensis* and *Clitandra elastica* furnish good products, whereas *Carpodinus hirsutus* and *C. fulvus* yield only low-grade "flake rubber." *Landolphia florida* yields cheap "paste rubber." *Ficus vogelii* occurs also in this colony. *F. platyphylla* yields the so-called "Kano rubber," a hard, resinous product with properties similar to those of gutta-percha. *Funtumia* plantations have been developed of late years. Analytical figures relating to these various raw rubbers are given. D. S.

Rubber from Sapium Species in British Guiana. E. BECKETT. *J. Roy. Ag. Com. Soc. of Brit. Guiana;* through *Gummi Ztg.*, 26, 501.—*Sapium* species are mentioned as follows: *Sapium sannani*, is not well known yet; *Sapium biglandulosum*, grows along the coast—no value as a rubber producer; *S. paucinerum*, interior of colony—of no account as rubber plant; *S. aucuparium*, name recently changed by Dr. Huber to *S. helmsleyanum*; latex is said to be frequently mixed with that of *Hevea* species. D. S.

Removal of Odor from Soft Rubber and Rubbered Articles. M. SCHNURPFEIL. *Gummi Ztg.*, 25, 1694.—The odor is removed by inmersion of articles in a bed of charcoal for 4–8 hrs. at 60–70°. The charcoal is revived by ignition. Unburnt MgO is of some value but NH_3 cannot be recommended. D. S.

Influence of Mineral Ingredients on the Properties of Rubber. CLAYTON BEADLE AND H. P. STEVENS. *J. Soc. Chem. Ind.*, 30, 1421.—An attempt to trace by hysteresis curves, the influence of ZnO, talc, and MgO on the physical characteristics of vulcanized rubber. Standard mixings with increasing proportions of the mineral fillers were tested on the Schwartz tester. Five successive cycles were traced keeping the load const. The influence of the mineral compds. on the cyclic extension, cyclic remainder (permanent set each cycle under given load; abs.) and sub-permanent set produced by stretching test-piece to 4 times its original length for 24 hrs. and measuring set after resting 6 hrs. is shown in curves. The technically well known influence of ZnO, MgO and talc on the extensibility, and permanent set of vulcanized rubber is thus recorded. Comparisons were made on wt. and not on vol. basis; samples were tested on standard cure regardless of rate of cure; question of texture (degree of fineness) of the fillers themselves is ignored and finally the "combined" S is detd. as the difference between the S estd. by acetone and the S originally employed in the prep. of the compd. D. S.

Note on the Effect of Reworking Typical Para Rubbers. CLAYTON BEADLE AND H. P. STEVENS. *J. Soc. Chem. Ind.*, 30, 1425–6.—The effect on the physical characteristics of typical Para rubbers produced by reworking is shown by hysteresis curves. Standard mixings of (1) fine plantation crepe, (2) fine hard Para, (3) Malay "smoked sheet" were vulcanized before and after an additional working of 1 hr. on the mill. Results undoubtedly show differences in increase in extensibility of samples by re-

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working. [Abstractor refrains from quoting further conclusions drawn, until a discrepancy (of typographical origin probably) between curves and tables is corrected.] D. S.

Method for Determining the Amount of Insoluble Particles in Raw Rubber. CLAYTON BEADLE AND H. P. STEVENS. *Analyst*, **37**, 13–6; *India Rubber J.*, **43**, 193.—One g. of the finely cut rubber (av. sample) is placed in a test tube with 5–10 cc. of one of the solvents, nitrobenzene, high b. petroleum, or phenetole (the latter preferred). The temp. is gradually raised to 100°, kept there for $^1/_2$ hr., then slowly raised to 140° for 1–1$^1/_2$ hrs. After heating to a certain point, the jelly-like mass becomes rapidly thin and liquid. After cooling, the whole is poured into 100 cc. benzene and the insol. matter allowed to settle. The soln. is decanted, the residue washed several times with benzene, then transferred to a filter and washed again. In some cases the sol. matter may be best removed by repeated decantation with naphtha, evapg. off the last traces and weighing the residue in a tared dish. Figures are given for the insol. matter obtained from different varieties of rubber. Repeated tests are stated to agree. The sediment obtained by this method is structurally uninjured and is suitable for microscopic exam. J. YOUNG.

Influence of the Ultraviolet Rays on Rubber. L. RAYBAUD. *Caoutchouc & Gutta-percha*, **8**, 5736; cf. *C. A.*, **5**, 3518.—Action of ultraviolet rays appears to be strongest between wave lengths of 3030–3600. Rays of wave length smaller than 3030 are thought to be absorbed by surface of the substance, whereas those of greater wave length penetrate into the mass. Ultraviolet rays of sunlight are particularly active and R. recommends the painting of balloon envelopes with colors which are not affected by these rays. D. S.

Scientific and Economic Problems in Connection with the Rubber Industry. F. W. HINRICHSEN. *Chem. Ztg.*, **35**, 1308.—Address dealing with problems of production and manuf. of India rubber. D. S.

Determination of Antimony in Red Rubber Goods. W. SCHMITZ. *Gummi Ztg.*, **25**, 1928.—In replacing the older grav. methods for the detn. of Sb in red rubber goods by a volumetric method, the chief difficulty to overcome is the complete destruction of the organic matter without loss of Sb by volatilization. The methods hitherto employed are discussed. Some of these methods, however, are deficient, and all aim at final detn. of the Sb gravimetrically. S.'s method admits of easy oxidation of the organic matter without loss of Sb or Hg if present. The presence of cinnabar was found to reduce the time of oxidation of the organic matter to $^1/_3$ but the results for Sb were about 1% too low. This difficulty is overcome by addition of $KHSO_3$ which reduces pentavalent Sb to trivalent, at the same time preventing further action of $HgSO_4$ by reducing it to metallic Hg which can be filtered off. Process: 2–4 g. of the finely divided rubber are heated with conc. H_2SO_4 in a Kjeldahl flask. For 1 g. substance, 13–15 cc. H_2SO_4 are used. If no cinnabar be present, a minute drop of Hg or a small quantity of an Hg salt ($HgSO_4$ or $HgCl_2$) is added, 0.1 g. Hg being sufficient. A small piece of paraffin wax may be added to prevent frothing. The heating is continued on a sand bath using single burner till most of the charred matter disappears and the liquid commences to become clear. It is now allowed to cool and after the addition of 2–4 g. K_2SO_4, re-treated till perfectly clear, which takes several hrs. The cold soln. is now dild., whereupon $HgSO_4$ seps. with cloudy appearance. After addition of 1–2 g. $KHSO_3$ and excess tartaric acid, the soln. (which must be sufficiently dil. to prevent charring) is boiled to remove SO_2. A few drops of conc. HCl are then added and the soln. made up to 200 cc. After filtration to remove metallic Hg or other insol. substances, it is directly titrated with I and thiosulfate, or better with 0.1 *N* $KBrO_3$ soln., using Me orange as indicator. The results are good. W. F. RUSSELL.

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Determination of Antimony in Red Rubber Goods. FRITZ FRANK. *Gummi Ztg.*, **25**, 2002.—Reply to W. Schmitz's criticism of the author's process (*Gummi Ztg.*, **25**, 1928–9; see above abstr.) containing nothing new. W. F. R.

The Latex of Euphorbia elastica. JAMES MCCONNELL SANDERS. Mexico. *Anales inst. med. nacional*, 10, 69–74.—The latex is yellowish white in color; d^{15} is about 1.1163, varying within narrow limits according to age of the tree and season of the year. It is coagulated on exposure to air, forming a resinous mass; under certain conditions it may undergo butyric fermentation. Its comp. is: H_2O and substances volatil at 120°, 64.98%; resins and nitrogenated fatty substances, 24.18%; caoutchouc, 10.85%. The mixt. of resinous and fatty substances gave on a series of fractionations with various solvents: (1) a white cryst. substance somewhat resembling alban of gutta-percha; (2) a yellow resin, hard and brittle, easily sol. in alc., acetone and turpentine; (3) protein and nitrogenous substances; (4) an oil of peculiar odor; (5) a fat; (6) a yellow coloring matter. Only the rubber was investigated. Ultimate analysis showed the presence of the group $(C_5H_8)_n$. Expts. on vulcanizing with fillers and with S alone showed that an elastic product of fair quality could be obtained from specimens containing as high as 15% resin, when cured with 15% S and 20% BaO. The best product obtained is lacking, however, in resisting qualities and its production industrially is difficult owing to the large % of resin and the expense of extracting the same. H. S. PAINE.

Caoutchouc, British Pharmacopeia. C. T. GARDNER. *Chem. Druggist*, **79**, 386–7.—The com. article is not entirely sol. in $CHCl_3$ or oil of turpentine as stated in the B. P. Limits of impurities and max. % of ash in the washed and dried rubber are recommended. Simplified methods of detn. of moisture, ash, proteins and resin are given. A. VORISEK.

The Effect of Sodium Nitrate upon the Flow of Ceara Latex. R. D. ANSTEAD. *Planters' Chron.*, 6, 203–5; *Expt. Sta. Record*, **25**, 240.—A compilation of information relative to the present status of the rubber industry in the Philippine Islands. J. J. M.

Examination of Finnish Turpentine (NASH). 22. Examination of Rubber-covered Wire (WREAKS). 4.

U. S., 1,015,468, Jan. 23. N. F. AVERY. **Composition containing reclaimed rubber, for use in making shoes.**

U. S., 1,015,688, Jan. 23. E. KELLY. **Furniture polish.**

U. S., 1,016,162, Jan. 30. J. R. KÖHLER. **Making betulin suitable for use in coating compositions.**

U. S., 1,016,295, Feb. 6. L. N. SAHM. **Composition for staining or dyeing wood, leather, paper, etc.**

U. S., 1,016,483, Feb. 6. W. W. DUNCAN and N. E. TOUSLEY. **Apparatus for coating fabric with a film of rubber.**

U. S., 1,016,445, Feb. 6. C. M. E. SCHROEDER. **Paint and varnish remover.**

Can., 137,553, Dec. 26, 1911. E. E. BANES. **Manufacturing $Pb(OH)_2.2PbCO_3$** by projecting PbS through a blow-pipe flame into a heated oxidizing atm. and sepg. from fume gases.

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28. SUGAR, STARCH AND GUMS.

A. HUGH BRYAN.

Sour Cane. W. E. CROSS. *Louisiana Planter*, 48, 3–4.—In Louisiana, the bacterium (*Leuconostoc mesenteroides*) is the principal one destroying sucrose in sugar cane when the latter has suffered from a freeze and then a change to warmer weather. The characteristics of a fermented juice are increase in acidity, and a gummy and a characteristic bleached appearance. The acidity of a juice is, however, no criterion of the extent of fermentation or of the capability of producing sugar from such a juice. The usual purity detn. is not much of a criterion of a fermented juice for the products of fermentation are often dextrorotatory and greatly influence the direct polarization and sucrose (Clerget). With fermented juice, the polarization should be taken in a soln. clarified with alc. In this way a true purity can be obtained and the value of the cane determined. A. H. BRYAN.

Some Results on the Tech (Acidity of Cane as a Criterion for its Manufacturing Value). J. P. CONNOLLEY. *Louisiana Planter*, 48, 29.—Cane juices with as high acidity as 6 (cc. of 0.1 *N* KOH to 10 cc. of juice) have yielded good sugar, while other makers refuse cane with 4 acidity (see preceding abstract). A. H. BRYAN.

A Study of Maple Sirup. A. MCGILL. Inland Rev. Dept., Ottawa, Canada, *Bull.* 228.—Analytical results are given on 456 samples of maple sirup collected throughout Canada. Moisture, ash, Pb subacetate ppt. and malic acid value were detd. As a result of the work, the following standards for pure products are set forth. Maple sugar should contain not more than 10% of water, not less than 0.60% of ash in carbonate condition, not less than 0.12% insol. ash (in water), not less than 0.30% malic acid, all based on dry basis. It yields a Pb number not less than 1.7 (by Canadian method) and 1.2 (by Winton method). A maple sirup should not have more than 35% water, and the dry substance similar to maple sugar. A. H. BRYAN.

Starch and Glucose Industries in the United States. *Oil, Paint, Drug Rept.*, Aug. 7, 1911; *J. Soc. Chem. Ind.*, 30, 1080. E. J. C.

Inversion of Sucrose by Ultraviolet Rays. H. EULER AND H. OHLSÉN. Univ. Stockholm. *J. chim. phys.*, 9, 416–22.—Neutral 5 and 10% solns. of sucrose were exposed in quartz vessels of 6.2 cc. capacity to the rays from a Heraeus quartz lamp (2.5–2.6 amp. and 80–6 v.). In 20 min. the temp. rose to 79° and then remained const. (±0.5°). The rotatory and reducing powers were detd. before exposure, 20 min. after and every hr. thereafter. Preliminary expts. showed that 100 hrs. exposure to sunlight or heating to 80° had no appreciable effect. In ultraviolet rays, the change in rotation increases with the time; the amt. inverted in a given time is independent of the amt. of sugar present. An acid is formed during the reaction, its formation depending on the presence of a catalyst in minimal amts. in the sugar solns. The reaction is thus an "autocatalyzed" one.

CHAS. A. ROUILLER.

Velocity of Saccharification of Starch. VI. HENRI VAN LAER. *Bull. sci. acad. roy. belg.*, 1911, 795–830.—Even at small conc. maltose exercizes an inhibiting action on diastase but this almost negligible influence cannot oppose marked increases in the velocity coeff. of a saccharification; the combination "maltose + diastase" seems to result from the union of very small amts. of the ferment with a large excess of sugar. The reducing powers in transformations in the same series cannot be compared in the vicinity of the limits of saccharification. Kjeldahl's law of proportionality may hold well below and beyond the limit of 45% maltose; besides the inhibiting action of maltose, almost negligible for small conc. of starch, there are other factors, some accelerating,

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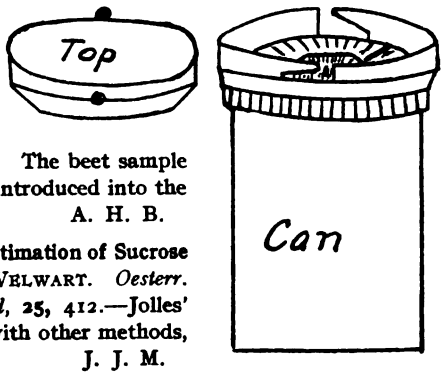
others retarding. Among those having the greatest influence on logarithmic reactions is the more rapid decrease in starch conc. in those solns. containing more diastase. When Kjeldahl's law holds at any given moment in 2 saccharifications, 1 of which is logarithmic, the other suffers a positive or negative acceleration which increases or decreases the velocity coeff. The influence of the amt. of diastase on the velocity of saccharification is expressed by the equation $K = nFm$; as long as 1 of the reactions follows the logarithmic law for monomol. transformations, $m = 1$; if 1 of these reactions deviates, at any given moment, from the law of mass action, m becomes slightly greater than 1. This increase of m is not due to a greater adsorption of enzyme in systems rich in disatase; it is because the logarithmic stage at the beginning of the reaction no longer exists when the reaction is interrupted. Whereas with acids, the velocity of saccharification depends on the no. of ions per unit vol., in the case of malt diastase it depends, at every instant, on the relation between the mass of adsorbed diastase and that of maltose to be produced. All the peculiarities shown by the velocity coeff. of saccharification can be explained on the basis of adsorption combinations which the enzyme forms with the substrate on the one hand and with the products (maltose and dextrins) on the other. Kjeldahl's law, when applied to logarithmic reactions, is approximative. C. A. R.

The Andrlik Method of Polarization as Applied to Cane Products. H. PELLET. *Intern. Sugar J.*, 14, 28.—P. agrees with Cross and Taggart (*C. A.*, 6, 550) that urea does not completely inhibit the inversion action of HCl in pure sugar solns. However, Andrlik's method (*C. A.*, 1, 1912) was for impure sugar solns. In such products, the quantity of Pb subacetate added to clarify tends to neutralize some of the HCl so that the inversion is slowed; also the HCl takes the place of the AcOH and, therefore, weaker acids are present. In spite of this defect, the principal of acid polarization is an excellent one. Improvements in the method are being tried out by adding more acid and also urea and increasing the time of inversion. A modified method will soon be published. A. H. BRYAN.

Contrivance for the Estimation of the Sugar Content of Beets by the Hot Water Digestion. ANON. *Oesterr-Ung. Z. Zuckerind.*, 40, 704.—The vessels are of metal and likewise the top which clamps in by mean of knobs into the top of the vessel. Ease of cleaning is claimed for this form. The beet sample is weighed on watch-glass and the whole introduced into the cap. A. H. B.



Jolles' Method for the Quantitative Estimation of Sucrose among other Sugars. BRUCKNER AND WELWART. *Oesterr. Chem. Zig.*, 14, 29–30; *Expt. Sta. Record*, 25, 412.—Jolles' method (*C. A.*, 5, 800), when compared with other methods, cannot be regarded as quantitative. J. J. M.

Gravimetric Estimation of Sucrose by Oxidation with Chromic Acid. ADOLF WECHSLER. *Oesterr-Ung. Z. Zuckerind.*, 40, 683–703.—W. applies the usual method of estg. C, *viz.*, burning in presence of chromic acid and H_2SO_4, to the estn. of C in sugar soln. and from this figure calculates the % of sugar. A cut of the app. used is given, together with a description. It consists of 2 parts, a flask for the oxidation with a sealed tube for introducing the sugar soln. a little at a time, and a gas washer also sealed into the stopper. The other part of the app. is the Bender and Hobein potash bulb, which is partially filled with H_2SO_4 to dry the evolved CO_2. The oxidizing

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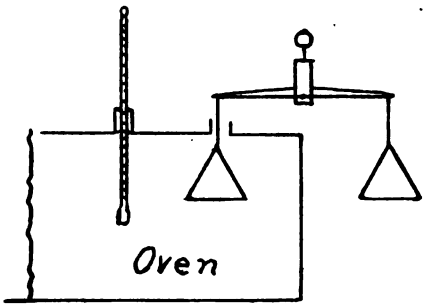
soln. consists of 500 cc. conc. H_2SO_4, 300 cc. H_2O and 100 g. CrO_3; 50 cc. are used for a detn. This quantity is capable of oxidizing 0.15–0.25 g. of C. One g. of sucrose contains 0.421 g. of C, so from this figure the quantity of sugar soln. to be used can be calc. With pure sugars the results compare with the polarization figures. For sugar in beet, the water ext. is clarified with basic Pb nitrate (Herle's soln.) and this used for the detn. With molasses containing CO_2 and other easily decomposed substances, a previous treatment with H_2SO_4 is necessary to remove these before oxidation. By detg. the total oxidizable C in a soln. and then subtracting the C calc. from the sugars present as detd. by polariscope or Fehling's soln., a valuable indication of the non-sugars present is obtained. A factor can be obtained in this way that will be more valuable then the purity coeff. A. H. BRYAN.

Determination of Moisture in Beet Seed. H. PLAHN. *Centr. Zuckerind.*, 19, 1549–50.—The usual method is to dry approx. 5 g. of the seed balls to const. wt. at 100° for at least 14 hrs. This does not include the so-called "colloid water." This method is tedious when a number of samples are to be worked. P. tried weighing samples directly in the oven as shown by cut. In this way the time was cut to 5 or 6 hours. Experimental work showed that the time could not be shortened by subdividing the sample and heating higher for some of the "colloid water" was driven off. The decrease in wt. of 5 g. after 60 min. was in proportion to the amt. of water in sample. A table was constructed, as the av. of a large number of detns., showing the decrease in wt. after 30 min. and 60 min. and the respective percentages of water. The moisture content should be taken when const. weighings are first observed, generally after 110–125 min., according to moisture content. A. H. BRYAN.



The 1911 Java Sugar Crop. H. C. PRINSEN-GEERLIGS. *Intern. Sugar J.*, 14, 16–23.—The crop is estd. at 1½ million tons. White sugar is being manufactured to a large extent now direct from the cane. The juice is limed to slight alkalinity and then sulfured to a slight acidity. In this way a pure juice is obtained. After conc. to a sirup this is also sulfured, and then boiled in a pan. The carbonation process is carried out to a slight extent, but is found a little more expensive; however, it is believed to yield larger quantities of sugar than the sulfitation process for white sugar. After b. in a pan the mass is centrifugated, the brown sugar cut down and mixed with a satd. clear sugar soln., then centrifugated again. A. H. BRYAN.

Removal of Incrustation (from Evaporators, Etc.) by the Natural Fermentation of Molasses. KARL HARTMANN. *Oesterr-Ung. Z. Zuckerind.*, 40, 715–7.—H. recommends filling the evaporators, carbonation tanks, presses, etc., with a 5% molasses soln. and allowing it to ferment (4 or 5 weeks). The removal is accomplished by the formation of acids. After the soln. is removed, water and heat are applied. A. H. BRYAN.

Steam Drying Apparatus "Imperial." BERT SCHENER AND ALEX. OLESZKIEWICZ. *Oesterr-Ung. Z. Zuckerind.*, 40, 718–22.—A description of an app. capable of turning out dried pulp with only 13% H_2O. A. H. BRYAN.

Wasted Water Purification for Sugar Factories Separated into Mechanical and Chemical Polluted Water. BERT SCHENER AND ALEX. OLESZKIEWICZ. *Oesterr-Ung.*

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Z. Zuckerind., 40, 723–5.—Sugar factories have 2 kinds of water for purification, (1) that for swimming in the beets and pulp water and (2) that for the mfg. process, diffusion, etc., that must likewise be purified. A description of the Rientsch patent and the May patent for (1) is given. The use of lime for (2) is discussed. A. H. BRYAN.

Preservation of Beet Pulp by the Lactic Ferment. E. MALPEAUX. *Betterave*, 20, 340–4.—By inoculating beet pulp with lactic ferment, the comp. changes very little; only a slight loss of dry substance is noticeable. The repulsive smell of siloed pulp is suppressed giving place to an odor of fresh cossets. No change in the feeding value for lambs was noted. Farmers can easily inoculate their supply of pulp.
A. H. BRYAN.

Ultramarine, its Use for Bluing Sugar. ANON. *Intern. Sugar J.*, 14, 38.—Ultramarine is used to mask the yellowish tint of the sugar. It is a question whether it is best to use it in the pan during boiling or to wash the sugar with a weak soln.
A. H. BRYAN.

Effect of Greater Application of Nitrogen on Sugar Beets. A. HEEKE. *Oesterr-Ung. Z. Zuckerind.*, 40, 669–79.—Expts. show that in N-poor sandy soils, the tonnage of sugar beets will be increased by N manuring, providing enough water is present. The wt. of leaves, however, is increased much more than the beets. The sugar content does not go up, however, with extra heavy N fertilization on such ground. The N content of the beet goes up in a much higher degree than the sugar, especially the "Schadlich" N, so that the beets are of less quality. In the presence of K and P_2O_5 only an abnormally high dose of N fertilizer will give an increase of N in the beet, while in general a careful application of saltpeter N will cause an increase in sugar without a loss in quality. A. H. BRYAN.

Influence of Common Salt upon the Germination of Beet Seed. E. M. VASILIEV AND A. POMASKII. *Westnik. Sach. P.*, 3, 78 (1911); through *Centr. Zuckerind.*, 19, 1610.—Briem has found that a moderate application of NaCl to the soil has a favorable effect upon sugar beet. The authors tried the effect of NaCl on the germination of beet seed. Three lots of seed, one soaked in satd. NaCl soln. 6 hrs., another in same for 24 hrs., and the 3rd untreated, were planted in sand at 19°. The 6-hr. treatment seemed to accelerate the germination of the seed during the first 7 days, but after that the control went ahead. The 24-hr. soaking gave inferior results. A. H. BRYAN.

Occurrence of Chitin. EDMUND O. VON LIPPMANN. *Ber.*, 44, 3716–7.—Chitin was formed on the sides of a glass of sirup from a sugar factory, after the liquid had remined during several months. J. BISHOP TINGLE.

Optical Behavior of Dextrose (PROFILO). 10.

U. S., 1,015,650, Jan. 23. C. STEFFEN. **Extracting sugar juices by hot lixiviation.**

U. S., 1,015,941, Jan. 30. C. L. CORCUERA. **Extracting saccharin substances from plants by a counter current of liquid.**

U. S., 1,016,019, Jan. 30. F. LAFEUILLE. **Sugar crystallizer.**

U. S., 1,016,503, Feb. 6. E. B. HUTCHINS, JR. **Dehydrating raw Irish potatoes.**

U. S., 1,016,761, Feb. 6. C. C. Moore. **Producing starch and glucose from cassava.**

U. S., 1,016,762, Feb. 6. *Idem.* **Obtaining starch and sugars from cassava.**

U. S., 1,016,803, Feb. 6. J. VERITY. **Manufacture of dextrin.**

Can., 137,548, Dec. 26, 1911. M. F. EWEN, *et al.* Production of fermentable sugar

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from ($C_6H_{10}O_5$) by adding H_2SO_4 to ($C_6H_{10}O_5$) and H_2O and raising the temp. quickly. When the reaction is complete temp. is reduced to 100°.

29. LEATHER AND GLUE.

LLOYD BALDERSTON.

Bibliography of Tannery Waste Treatment. P. A. ESTEN. *J. Am. Leather Chem. Assoc.*, 6, 464–6. CHARLES R. OBERFELL.

Note on the Analysis of Tannins (Preliminary). A. C. ORTHMAN AND L. E. LEVI. *J. Am. Leather Chem. Assoc.*, 6, 466–76.—On the theory that the complex Cr compds. break up into insol. Cr products and ppt. quant. according to the amt. of tannins present the authors tried 31 different reagents (Cr salts) and found ($Cr_2SO_4(C_2H_3O_2)_2$·CrO_4) pptd. the tannins quant. and not the non-tannins according to the hide-powder method. The pptd. Cr_2O_3 was detd. by the iodiometric method. C. R. O.

The Tannins; Characteristic Reactions of Value for their Identification and Detection in Mixtures. A. W. HOPPENSTEDT. *J. Am. Leather Chem. Assoc.*, 6, 476–9.—Compilation of all tests which have proved of value to H., including source of test, procedure and results. CHARLES R. OBERFELL.

Some Laboratory Notes on Divi-divi. CHARLES R. OBERFELL. *J. Am. Leather Chem. Assoc.*, 6, 496–7.—Results of analysis and color-test on sheep skin of Mexican divi-divi (cascalote). C. R. O.

The Filtration of Tannin Analysis Solutions under Reduced Pressure. CHARLES R. OBERFELL. *J. Am. Leather Chem. Assoc.*, 6, 505–8.—Filtration under reduced pressure, using alundum as the filtration medium. This material was found suitable and more satisfactory than the asbestos-kaolin mat and the Berkefeld candle. C. R. O.

Value of Sulfite-Cellulose Extracts for Blending. JOHN H. YOCUM AND THOMAS A. FAUST. *J. Am. Leather Chem. Assoc.*, 6, 537–43.—Tanning exts. made from the waste lye of the sulfite-cellulose process act differently when mixed with different tanning materials. Two grades of sulfite-cellulose ext. were mixed with ordinary and clarified quebracho, cutch, chestnut wood, myrobalans and valonia in various proportions and the resultant mixt. analyzed. With the exception of liquid clarified quebracho ext. there is a greater or less loss of tannin by such mixing. C. R. O.

The Weighing of Pelt in Water as a means of Tannery Control. J. G. PARKER AND J. R. BLOCKEY. *Leather*, 3, 872–3.—There are given results obtained in expts. on the value and application of weighing hides in water. The water wt. is the wt. of the actual leather substance independent of moisture present; this is a better indication of what the finished leather wt. will be than the air wt. of the pelt. If the air wt. be divided by the water wt., the higher the ratio the more the hide is plumped. J. S. ROGERS.

Analysis of Oakwood Extract. J. JEDLICKA AND K. DLOUHY. *Collegium*, 1911, 253–8. L. BALDERSTON.

The Analysis of Tanning Extracts. E. SCHELL. *Cuir*, 5, 37–41.—Exception is taken to the use of the shake method in the analysis of bisulfited exts., since the non-tans by this method give tests for tannin with Fe alum and other reagents, while non-tans by the filter method do not. L. BALDERSTON.

Qualitative Tests for Various Tannins. J. SCHNEIDER AND A. SEIWERTH. *Collegium*, 1911, 282–8.—The first method discusses the action of tanning solns. as dyes, on cloth mordanted with various metallic salts. The colors given are tabulated

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and grouped. The second method uses spectral absorption. Alc. solns. give the best results, and the oriented lines for various tannins are tabulated. L. BALDERSTON.

The Microscopical Examination of Tanning Extracts. G. GRASSER. *Collegium*, 1911, 349–55.—G. finds in the insol. residue particles characteristic of the materials from which the ext. was made. Microscopic slides made from several much used extracts are reproduced. L. BALDERSTON.

The Action of Light in Tanning, Especially in the Chrome Process. B. KOHNSTEIN. *Collegium*, 1911, 291–6.—Exposure to light during the process of manuf. causes bleaching in some cases and darkening in others. In the 2-bath chrome process, it is necessary to protect from light in the first bath. The dichromate in the presence of hide acts in the same manner as in the case of gelatin, producing in the light an insol. dark compd. Under red or yellow glass there is little action. L. B.

Tanning with Bromine and Hypobromites. L. MEUNIER AND A. SEYEWETZ. *Collegium*, 1911, 288–91.—If gelatin previously softened in water be treated 2–3 hrs. with Br water, 15 g. per l., and then thoroughly washed, it is found to be insol. in Br water. Portions treated with varying amts. of Br water for 3 hrs. and then washed 48 hrs. in a flask, retained per 100 parts dry gelatin from 0.46 to 2.4 parts Br. Treatment with $NaHSO_3$ reduced the amt. of Br retained to 0.9%, which seems the smallest amt. which will render gelatin insol. In expts. on hide, in order to avoid excessive swelling due to HBr unavoidably present, salt was added. For 1 kg. white hide, in 2 l. water with 100 g. salt, 2–3 l. Br water (20 g. per l.) were gradually added. After thorough washing, a pure white, very resistant, fine-grained leather is obtained. L. B.

Cerium Salts from Monazite Residues as Tanning Material. W. EITNER. *Gerber*, 37, 109–201, 213–5.—E. used $Ce_2(CO_3)_3$, from which he prepared $Ce_2(SO_4)_3$ and cerium alum. $Ce_2(SO_4)_3$ is sol. only when strongly acid; to restrain the swelling effect much salt was added. The skin treated thus was like a pickled skin, after washing seeming almost raw. Still worse results were obtained with cerium alum. Hide placed in a soln. of $Ce(SO_4)_2$ was quickly colored through (yellow) and rendered hard. This product tanned well in a quebracho liquor, making very stiff leather. $CeCl_3$ was also prepared from the carbonate and tried. The product was soft and elastic, whether wet or dry. Skins so treated and afterward tanned with quebracho made very good leather. The Ce salt acts as a mordant for the tannin, producing very little difference of color. $Ce(SO_4)_2$ prepared from the dioxide produced a leather not unlike that tanned with myrobalans. L. BALDERSTON.

A Harmless Method of Disinfection for Hides Infected with Anthrax. A. SCHATTENFROH. Univ. of Vienna. *Collegium*, 1911, 248–51; *Gerber Courier*, June 17.—The hides lie 1–3 days in a soln. of 1% HCl and 10% NaCl. After this they may be shipped damp without further treatment. The presence of so large a proportion of salt, hindering the ionization of the acid, did not diminish the disinfecting power. A 1% acid, 8% salt soln. took 1–2 days to kill all the anthrax spores in infected sheep and goat skins, at 20°, while 2% acid, 10% salt at 40° took but 6 hrs. L. BALDERSTON.

The Preservation and Disinfection of Hides and a New Method of Sterilization of Anthrax Spores. B. KOHNSTEIN. *Collegium*, 1911, 297–304.—The disadvantages of several methods of preserving hides are stated. Salt is the best preservative. Substances used for denaturing the salt often causes stains. In conjunction with the hygienic inst. of the Univ. of Vienna K. worked out a method of sterilization of anthrax spores which employs a 2% HCl, 10% salt soln. (see preceding abst.).
L. BALDERSTON.

Melting Point of a Gelatin Jelly (GAMBLE). 5.

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U. S., 1,016,137, Jan. 30. P. F. FROST. **Composition for waterproofing leather.**

U. S., 1,016,407, Feb. 6. K. HARTMANN. **Hardening and waterproofing animal skins.**

30. PATENTS.

Abstracts of patents are included under the foregoing divisions of the Journal. The abstracts of U. S. patents are prepared by Earl T. Ragan, those of the British, French and German patents by O. D. Swett and those of Canadian patents by Russell S. Smart, of Fetherstonhaugh & Co., Ottawa (5 Elgin St.). The abstracts of French patents are prepared, with permission, from the abstracts in *Chemiker-Zeitung*, those of German patents from *Chemiker-Zeitung* and *Chemisches Zentralblatt.*

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CHEMICAL ABSTRACTS

Vol. 6. APRIL 10, 1912. No. 7

I. APPARATUS.

L. C. JONES.

Melting-point Determination Apparatus. E. ANTHES. *Chem. Ztg.*, **35**, 1375.—A combination of the Thiele and Bunsen app. which possesses the advantages of both. J. H. MOORE.

Barometer for Laboratory Use. C. WOYTACEK. *Chem. Ztg.*, **35**, 1429.—A small U-shaped barometer tube, with adjustable scale, mounted on a heavy metal foot and covered with a glass mantel with a 3-way cock in the top. With the mantel in place the barometer may be connected into the vacuum line; with the mantel removed it may be used under a bell jar. J. H. MOORE.

Improved Drying Board. M. HEINEMANN. Berlin. *Chem. Ztg.*, **35**, 1429.—A soft rubber cap is placed on the end of the wood pegs to prevent breaking the beakers. J. H. MOORE.

Simple Filter Apparatus for Large Quantities of Liquid. F. W. RIXON. *Chem. Ztg.*, **35**, 1397.—A large bottle with 2-hole stopper is inverted over the funnel, or evapg. dish. In one hole is a glass supply tube reaching well into the funnel. In the other is a long tube for admitting air extending from a short distance above the lower end of the supply tube to the top of the bottle. J. H. MOORE.

The "Metrogas" Nitrogen Testing Apparatus. E. V. EVANS. South Metropolitan Gas Co., England. *Gas World*, **55**, 814–6.—Description of a portable app. for detg. N in gases. The gas is burned with CuO contained in a heated quartz tube, the quartz tube flushed out with CO_2, the CO_2 absorbed, and the vol. of N read. G. W. MOREY.

Apparatus for the Preparation of Oriented Crystal Plates. G. WULFF. Univ. Moscow. *Z. Kryst. Min.*, **50**, 14–6.—A useful attachment for the theodolite goniometer. E. T. WHERRY.

New Form of Rotating Crystallization Apparatus. G. WULFF. Univ. Moscow. *Z. Kryst. Min.*, **50**, 17–8.—A jar with water-tight cover, rotating on a horizontal axis, for overcoming the effect of gravity in modifying the habit of growing crystals. E. T. WHERRY.

A Vapor Gage. H. PARENTY. *Compt. rend.*, **154**, 25–8.—Largely mathematical. Diagram is given. H. MONMOUTH SMITH.

Telescoping Tubes for Bacterial Cultures. W. F. MONFORT. *Proc. Ill. Water Supply Assn.*, 1911, 130.—Describes and advocates use of glass caps for fermentation tubes instead of cotton plugs. Broth is made and sterilized in large tubes or bottles, plugged with cotton, and then added, after the measured quantity of water, to the steril tubes, the glass caps being easily removed and replaced for incubation. D. K. FRENCH.

Mercury Ampere-hour and Watt-hour Meters. JOSEPH B. BAKER. *Elec. Rev. West. Elec.*, **60**, 282–4.—Description of the latest meters of the Faraday-disk motor type. L. K. MULLER.

Electrostatic Voltmeter for Very High Tension. H. ABRAHAM AND P. VILLARD. *J. Physique*, [5 **1**, 525–30.—Consists of a metal cylinder mounted on a glass rod as shown

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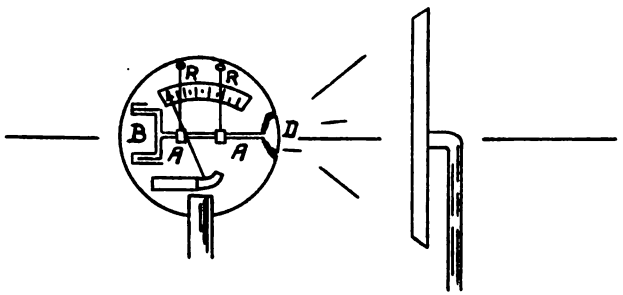
in the sketch. The principle is the same as that used by Lippmann in his absolute spherical electrometer. The electrostatic force acting upon the metal cap *D* forces



back the cylinder *A,A*, which is supported by the thin steel ribbons *R,R*. The movement of the bar is indicated by the needle on the scale. *B* is to dampen the movement. Pressure up to 300 kv. may be read with a fair degree of accuracy.

W. E. RUDER.

A Spectrograph. J. ZENNECK. *Physik. Z.*, 12, 1199–1201.—A spectrograph which with a He tube, a slit of 0.03 mm. and a 4 milliamt. current gave the lines 597 (yellow), 447 (blue), and 388 (ultraviolet) in one second, using a panchromatic plate. Scale drawings are given. H. MONMOUTH SMITH.

An Ultra-red Spectrometer. C. LEISS. *Physik. Z.*, 12, 1252–4.—An instrument adapted for work in either the ultra-red or ultraviolet. Mirrors are used in place of lenses. Dispersion is produced by either prism or grating. Advantages are: (1) A non-movable radiometer or thermocouple; (2) prism at the minimum deflection; (3) graduations to 5′ permits of measurements accurate to one Å. u.; (4) is not affected by jarring; (5) a second slit makes possible the screening of a line without adjusting the thermocouple. H. MONMOUTH SMITH.

Insulated Double Connectors. W. G. CADY. *Physik. Z.*, 12, 1254–5.—A connector for use at the lecture table where high voltages are present or where short circuits are likely to occur. A hard rubber or fiber sheath encloses two brass bearings held against each other by a steel spring. By pressing a knob these bearings are opened to receive the connecting wires which are held firmly by the spring when the pressure is released. Size about 35 mm. × 12 mm. H. MONMOUTH SMITH.

The Determination of Naphthalene in Wash Oil and the Water Content of Tar. TH. HAHN. Kötzschenbroda. *J. Gasbel.*, 54, 1249–50.—A convenient app. for H_2O and $C_{10}H_8$ detn. by distillation. GEORGE W. MOREY.

Impact Testing Machine for Pitch. W. H. FULWEILER. *Good Roads*, 3, 81–2.—Description of a machine for detg. the quality by the application of an instantaneous breaking load to a film of pitch enclosed between steel dies. A relation is shown between the breaking strength and the viscosity as detd. by penetration.

A. J. PHILLIPS.

Steam Refrigerating Machines. E. JOSSE. *Z. ges. Kalteind.*, 18, 137–41; *J. Soc. Chem. Ind.*, 30, 1198.—A refrigerating machine of new form where the steam from the evaporator is condensed in vacuum after passing through a steam jet compressor. A temp. of —7° is obtained with an abs. pressure of steam in evaporator of 0.004 atm. The steam consumption is rather higher than with other systems but the machine is of simple construction, has no moving parts, no high pressures, and uses water as refrigerating liquid. H. MONMOUTH SMITH.

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Determination of Vapor Density (EGERTON). 2. Test for Water in Petroleum (PRUTZMAN). 22. Fermentation Saccharimeter (WEIDENKAFF). 11B. Gas Calorimetry. 21. Hardness of Plasters (MCKENNA). 20.

Ger., 229,978, Apr. 10, 1910. FR. WIERUTSCH. **Sampling apparatus** for solid bodies, consisting of a tube-like receptacle with a piston movable in the receiving tube.

Ger., 230,438, Jan. 21, 1910. C. HARZER. Addition to 213,804. **Leaching apparatus** with pipe terminating in the receiving vessel in which a conveyor worm rotates in order to remove the solid substances, said worm being surrounded with a filtering jacket, and also scraping the solid constituents from the filtering surface, the turns of the worm having teeth on their outer edges or notches in order to remove the hardening layer, the worm being adjustable and movable longitudinally so that by moving it to and fro it can form a new surface.

Ger., 230,943, May 4, 1910. C. SEIB. App. for **handling sterilized plaster bandages.**

Ger., 231,372, Mar. 5, 1909. CH. E. VALLERY. **Saturation apparatus for liquids,** built into the outlet valve.

Ger., 231,582, Jan. 21, 1909. A. WIESE. App. for **effecting solution of salts,** the latter being fed in opposition to a counter current of the solvent. Details of construction are specified.

2. GENERAL AND PHYSICAL CHEMISTRY.

JOHN JOHNSTON.

Review of Physical Chemistry in 1911. W. HERZ. *Chem. Ztg.*, 36, 77–8, 82–4, 111–2. E. J. C.

Cryoscopic Anomalies of Elements of the Fourth Periodic Group. PIETRO FALCIOLA. *7th Intern. Congr. Applied Chem.*, 1909 (*Sect. X*), 159–61; *J. Chem. Soc.*, 100, II, 370. J. J. M.

Chemical Constitution and Crystallin Structure. L. BRUNET. *Rev. gén. sci.*, 22, 942–9.—An exposition of the theories of Barlow and Pope (*C. A.*, 1, 1118, 1809, 2973; 2, 498, 1418, 3215; 3, 298). J. C. HOSTETTER.

Variation with Temperature of the Viscosity of Gases of the Argon Group. M. REINGANUM. *Physik. Z.*, 12, 779–80.—The relationship between T_c and C discussed by Rankine (*C. A.*, 4, 3155) was pointed out in 1899 in the author's Göttingen dissertation. J. J.

The Maxwell Law of Distribution of Velocity in the Theory of Relativity. FERENCZ JÜTTNER. Berlin. *Ann. Physik*, 34, 856–82; cf. *C. A.*, 5, 2206.—A discussion of the thermodynamic functions of an ideal monoatomic gas at rest. J. J.

Dynamics of a Gas in Motion According to the Theory of Relativity. F. JÜTTNER. *Ann. Physik*, 35, 145–61; cf. preceding abstr.—A similar discussion for the case of a gas in motion. J. J.

Thermodynamics of Equilibria in One-component Systems. I. Equilibria between Isotropic and Anisotropic Phases. G. TAMMANN. *Nachr. Ges. Wiss. Göttingen*, 1911, 236–60; *Ann. Physik*, 36, 1027–54; *Z. Elektrochem.*, 17, 745–9.—According to pure thermodynamics, two main kinds of equil. curves are possible in one-component systems. On the one kind of curve a critical point occurs, that is, a point at which the difference of energy and vol. of the 2 phases vanish simultaneously; this type of curve is found when both phases are completely

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isotropic. But when one or both the phases is anisotropic, no critical point can be obtained; in this case equality of sp. vol. does not necessarily imply identity of the phases, and no continuous transition from one phase to the other is possible. The purpose of this paper is to derive the conditions which det. the type of equil. curve; these conditions are connected with the dependence of (1) the vol. difference of both phases upon pressure, and (2) the variation of their energy difference with temp. The regions of stability of pairs of isotropic phases are not limited in all directions; those of phases, for which there is no critical point on the equil. curve, must be bounded on all sides. The available experimental evidence in support of this position is discussed; it is taken almost entirely from the author's book (*Krystallisieren und Schmelzen*, (1903)). The whole paper indeed is a re-statement and amplification of views enounced in this book.

II. Polymorphism. *Nachr. Ges. Wiss. Göttingen*, 1911, 325–60.—Polymorphs may belong to the same crystal system or to different systems; they differ in relative stability, some being absolutely stable within the whole region of their existence, others only partially stable, still others altogether unstable. The present inquiry is a study of the thermodynamic conditions which det. the equil. relations of polymorphs; its scope is best illustrated by a recapitulation of the headings of the sections: (*a*) *The relative positions of the equil. curves of stable and unstable forms* (melting and transition curves, illustrated by the diagram for the H_2O system); (*b*) *Quant. relations between the position of the equil. curves of a series of forms of unequal stability and the stability of these forms.* The following conclusion is reached: that the position of the region within which partially stable forms can exist depends upon the vol. and energy-content of the forms; the relative magnitude of these properties det. whether the form is totally or partially unstable. (*c*) *Polymorphism and the molecular constitution of liquids.* From a statistical study of the available evidence it is concluded that from liquids which are non-associated (judging from the Eötvös const.), we obtain by crystn. only forms belonging to one crystal group; while associated liquids tend to give a variety of forms. From this it is inferred that crystals are formed only out of such crystal mols. as already exist in the liquid; hence the detn. of the mol. wt. of crystals is referred back to the mol. wt. of the liquid from which they formed.

J. JOHNSTON.

The Resistance to the Motion of a Thread of Mercury in a Glass Tube. GILBERT D. WEST. East London Coll. *Proc. Roy. Soc. London*, (*A*) 86, 23–5.—It is concluded that the velocity (v) of a thread of Hg l cm. long, in a glass tube of uniform radius a, subject to a driving pressure P (expressed in cm. Hg), is represented, with fair accuracy, by the equation $P = 0.038/a + 8l\eta v/a^2$, η being the viscosity of Hg at the temp. of expt.

J. JOHNSTON.

The Adherence of Flat Surfaces. H. M. BUDGETT. *Proc. Roy. Soc. London*, (*A*) 86, 25–35.—Polished plane surfaces of hardened steel can be made to adhere, or "wrung" together, so that a much greater force must be employed to separate them than would be required if the adhesion were solely due to atmospheric pressure. It is found that such plates do not adhere well when they are perfectly dry and clean, but the very slightest film of liquid is sufficient to ensure good adherence. When the blocks are pulled apart, breakage occurs in the film, and the great part of the force used apparently goes to overcome the mol. cohesion of the liquid.

J. JOHNSTON.

A Redetermination of the Density and Coefficient of Linear Expansion of Aluminium. F. J. BRISLEE. *Chem. News*, 105, 3–5.—Al of about 99.5% purity was used (Fe = 0.25, Si = 0.25%). The most probable value of d_4^{16} of Al is 2.708 for cast metal and for metal upon which a large amt. of work has not been done; for the worked metal it may reach 2.72. The coeff. of linear expansion, β, for hard-drawn Al, is 2.432×10^{-5},

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for annealed Al 2.454×10^{-5}, between 0 and 100°. Details and sources of error are given in the original. J. C. HOSTETTER.

The Decomposition of Nitrogen Peroxide in the Electric Discharge. J. ZENNECK AND B. STRASSER. Ludwigshafen a. Rh. *Physik. Z.*, 12, 1201–4.—In continuation of previous preliminary expts. on this phenomenon (cf. *C. A.*, 6, 315) an exam. was made of the spectra of the discharge in various parts of a U-tube through which flowed a stream of NO_2. The character of the spectra confirmed the conclusions which the authors had previously reached, namely, that decomp. of NO_2 in the elec. discharge takes place in 3 stages. The NO_2 first changes into an unstable intermediate form (probably N_2O_3) which almost immediately changes into NO, which in turn decomposes into N and O. The supply of NO_2 was obtained from a bulb of liquid N_2O_4 under diminished pressure. Special expts. showed that by the time the gas had reached the discharge tube it was NO_2 rather than N_2O_4. L. H. ADAMS.

A Chemically Active Modification of Nitrogen Produced by the Electric Discharge. II. R. J. STRUTT. *Proc. Roy. Soc. London*, (*A*) 86, 56–63; cf. *C. A.*, 5, 2601, 3193.—Active N is destroyed by O, although no combination takes place; it is unaffected by H. Active N, in reacting with NO to form NO_2, gives the same greenish yellow flame with continuous spectrum which is observed with mixts. of (1) O_2 and NO; (2) O_2 with NO_2; (3) active N with NO_2; or when NO or NO_2 is fed into a bunsen flame. By adding excess of NO to the glowing N leaving an elec. discharge, condensing the resulting blue substance (regarded as N_2O_3) in liquid air and weighing, the percentage of active N was detd. and found to be about 2.5%. The glowing N reacts only slowly with the vapor of P; this reaction accounts for the smaller percentages obtained previously, in which the active N was detd. by P absorption. It has a large elec. cond., comparable to that of a salted bunsen flame. All attempts to isolate the active N by liquid air condensation have failed. The expts. tend to show that the active N is monoatomic; some of the processes occurring in its presence are attributable to chem. action, others to a stimulation by the energy of the active N, without direct chem. action. J. JOHNSTON.

The Gaseous Condensable Compound, Explosive at Low Temperature, Produced from Carbon Disulfide Vapor by the Action of the Silent Electrical Discharge. JAMES DEWAR AND HUMPHREY O. JONES. Cambridge Univ. and Royal Inst. *Proc. Roy. Soc. London*, (*A*) 85, 574–89; cf. *C. A.*, 4, 1275.—Further expts. showed that the brown "ozonizer product" previously obtained was not due to any impurity in the CS_2. The changing of the white ozonizer product into the brown form is usually accompanied by a glow or flash, after shattering the tube; photographs of the exploding product indicate a high temp. The substance which gives rise to the brown solid is not condensed at —120°, but is at —185°; the transformation temp. is slightly above the latter. Only CS_2 is obtained when the vapor is allowed to pass over coconut charcoal; a partial sepn. of the ozonizer product from CS_2 is effected by rubber. Analysis showed the brown substance to be CS, probably in polymerized form. The action of the ozonizer product on several substances was studied. The polymerized CS obtained in this way is slightly different from that produced by the interaction of $Ni(CO)_4$ and $CSCl_2$ (*C. A.*, 4, 2074). The sp. ht. of the polymerized CS obtained by the latter method is 0.128 between —185° and +15°, and the ht. of combustion 179,700–176,400 cal. GEORGE W. MOREY.

Proportion of Carbon Dioxide in the Air of Antarctic Regions. A. MUNTZ AND E. LAINÉ. *Compt. rend.*, 153, 1116–9.—Between the latitudes 64° 49′ and 70° 5′ the av. CO_2 content of the air is 2.0524 vol. CO_2 per 10,000; at 69° 30′ only 1.447 vols. and at 70° 5′, 1.702. This is explained by the temp. of the sea water being at or below 0°, at which temp. the diss. pressure of acid carbonates is small. G. W. M.

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Production of Solid Oxygen by the Evaporation of the Liquid. JAMES DEWAR. *Proc. Roy. Soc. London*, (*A*) 85, 589–98.—Solid O was prepd. by evapn. of liquid O in a high vacuum produced with the aid of coconut charcoal, in a form of app. described in the orig. The temp. of solidification was found to be 54° abs. (detd. with H thermometer), and the melting presssure about 1.12 mm. G. W. MOREY.

Hofmann's Method for the Determination of Vapor Density. ALFRED G. EGERTON. Roy. Mil. Acad., Woolwich. *Chem. News*, 104, 259–60.—A modified form of Hofmann app. combining accuracy with ease of manipulation. GEORGE W. MOREY.

Flow of Heat through Contact Surfaces. CARL HERING. *Met. Chem. Eng.*, 10, 40–4.—Compilation of data on the flow of heat through contact surfaces, with discussion of application. GEORGE W. MOREY.

Simplifying some Thermal Calculations by the Use of the Thermal Ohm. CARL HERING. *J. Frank. Inst.*, 172, 569–78. GEORGE W. MOREY.

Conductivity of Pure Ether. J. CARVALLO. *Compt. rend.*, 153, 1144–5.—C. finds a cond. 50 times less than that found by Schröeder (*C. A.*, 3, 1958) and concludes that the Et_2O used by S. could not have been pure. Because of leakage the cond. of Et_2O cannot be studied in glass vessels. GEORGE W. MOREY.

Refractive Indices of Liquid Crystals. P. GAUBERT. *Compt. rend.*, 153, 573–6.—From a study of the refraction indices of several liquid crystals and of several mixts., the following conclusions are drawn: (1) The indices of refraction increase rapidly with temp. (2) The diff. between n for the isotropic liquid and for the liquid crystal is small. (3) The crystals of the birefringent phase produced before solidification are optically positive, while those appearing in the anisotropic liquid at a higher temp. are optically negative. (4) The optical properties of mixts. of liquid crystals do not follow the laws governing the properties of mixts. of isomorphous solid crystals. GEORGE W. MOREY.

Refractive Indices of Liquid Mixed Crystals. P. GAUBERT. *Compt. rend.*, 153, 1158–60; cf. preceding abstract.—The refractive indices of optically positive liquid mixed crystals follow approx. the laws governing mixts. of isomorphous solids; concordant values are difficult to obtain because of the large temp. coeff. Mixts. of optically negative liquid crystals do not follow the same laws, probably because of formation of a form unknown in the pure state. GEORGE W. MOREY.

The Solution Volumes of Nitric Acid. V. H. VELEY. *Chem. News*, 104, 309–12.—The soln. vol. of HNO_3 rizes rapidly from 0 to 4%, very slowly from 4 to 10%, slowly from 10 to 50%, rapidly from 50 to 90%, and falls from 90 to 100%. This is explained by the resolution of the $(H_2O)_4$ and $(H_2O)_3$ mol. of water into simpler mols., and the subsequent hydration of the HNO_3 mols. The fall from 90 to 100% is explained by association of the HNO_3. The behavior of H_2SO_4 is similar. GEORGE W. MOREY.

The Vapor Pressures of Liquid Mixtures and Fractional Distillation. M. A. ROSANOFF. Clark Univ. *J. Frank. Inst.*, 172, 527–44; cf. *C. A.*, 3, 1354.—Description of a new rapid method for measuring partial pressures. Several samples are distilled consecutively from a given liquid mixt., analyzed, and the comp. of the first infinitly small amt. of distillate calc. by extrapolation. Similarly, the wt. and comp. of the final distillate may be combined with those of the one preceding; these in turn with the one still earlier, etc. From these values there may be obtained by extrapolation the comp. of the vapor in equil. with the residue. The comp. of the latter is obtained by analysis. Thus two points in the vapor-comp. curve are obtained. The method and exptl. results will be published in detail. The author has also deduced a relationship between the total and partial pressures of binary mixts. permitting the calc. of the latter from the former. GEORGE W. MOREY.

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The Effect of Continued Grinding on Water of Crystallization. C. E. GILLETTE. *Chem. News*, 104, 313–4.—From grinding expts. with $BaCl_2.10H_2O$ the conclusion is drawn that most of the loss observed is due to superficial H_2O, although a small part of the H_2O of crystn. can be removed. The ground samples regained most of their water on standing in the air. Expts. with a number of other salts showed larger losses; "a part of the loss is undoubtedly due to efflorescence." GEORGE W. MOREY.

Solubility of Silver Chloride in Chloride Solutions and the Existence of Complex Argentichloride Ions. G. S. FORBES. Harvard Univ. *J. Am. Chem. Soc.*, 33, 1937–46.—F. dets. the solubility of AgCl in strong solns. (up to about 5 *N*) of several chlorides and concludes that the Cl ion and not the undissociated mols. is responsible for the solubility. No evidence of the ion $AgCl_2^-$ is found, but the existence of the complex ions $AgCl_3^{--}$, $AgCl_4^{---}$ and $AgCl_5^{----}$ is indicated. The increase of solubility with the temp. is found to be about 3% for 1°. For analytical work, AgCl is probably most insol. in 0.01 *N* solns. B. F. BRANN.

The Electrolytic Dissociation Theory. NIELS BJERRUM. *7th Intern. Congr. Appl. Chem.*, 1909 (*Sect. IX*), 58–60; *J. Chem. Soc.*, 100, II, 377. J. J. M.

The Conductivity of Certain Salts in Methyl and Ethyl Alcohols at High Dilutions. H. R. KREIDER AND H. C. JONES. Johns Hopkins Univ. *Am. Chem. J.*, 46, 574–85.—The authors have detd. the mol. cond. at 0° and 25° at dilns. from 800 to 102,400 l. of NaBr, LiBr, KSCN and $CoBr_2$ in MeOH and of the same salts except KSCN in EtOH. The salts and solvents were carefully purified but the cond. of the solvents is not given. It is stated, however, that MeOH of lower cond. than that formerly used (*C. A.*, 5, 1700) was obtained by treating the MeOH with a little dil. H_2SO_4 for 12 hrs., distilling, and finally distilling twice with lime. In the case of each uni-univalent salt Λ appeared to reach a max. value at about 6400 or 12,800 l., and this value is taken as Λ_0. The cond. of $CoBr_2$ continues to increase in the dilute solns., which is attributed to the fact that $CoBr_2$ is much solvated. The ratio at each temp. of Λ_0 in MeOH to Λ_0 in EtOH is approx. the same for each uni-univalent salt: mean values 2.44 at 0° and 2.37 at 25°. The corresponding ratios of the fluidities of the solvents, 2.17 at 0° and 2.27 at 25°, are somewhat smaller. The mean ratio at 0° for 4 salts of Λ_0 in H_2O to Λ_0 in EtOH is 2.33, while the corresponding fluidity ratio is very much smaller, 0.995. A similar large discrepancy is shown in the case of the solvents H_2O and MeOH. It is pointed out that these deviations from proportionality between Λ_0 and the fluidity of the solvent are always in the direction that Λ_0 is relatively small in the solvent which has the greater mol. mass. This is explained on the basis of solvation of the ions; it is assumed that the heavy EtOH mol. retards the motion of an ion more than the lighter MeOH or H_2O mol. W. C. BRAY.

Study of the Hydrogen Electrode, of the Calomel Electrode and of Contact Potential. N. E. LOOMIS AND S. F. ACREE. Johns Hopkins Univ. *Am. Chem. J.*, 46, 585–620.—In this paper are given in detail the procedure and manipulation for the making up of calomel electrodes in a cell specially designed to prevent contamination of the electrode soln. The cell Hg HgCl–0.1 *N* KCl is found to be reproducible to within 0.1 millivolt and remain so about 3 weeks. Pt electrodes were prepared which enabled values concordant to within 0.1 millivolt to be obtained for H electrodes in 0.1 *N* HCl. The e. m. f. of the system H_2| Pt-0.1 *N* HCl–0.1 *N* KCl-HgCl-Hg was found to be 0.4266. The observation of Bjerrum that satd. KCl solns. eliminate diffusion potentials was confirmed. The E_0 value (H as standard) for the electrode Hg-HgCl-KCl is given variously from 0.3355 to 0.339, depending upon the assumptions made and the method of calc. Several diagrams and photographs of the app. are included in the paper. PAUL V. FARAGHER.

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Application of the Hydrogen Electrode to the Measurement of the Hydrolysis of Aniline Hydrochloride and the Ionization of Acetic Acid in the Presence of Neutral Salts. N. E. LOOMIS AND S. F. ACREE. Johns Hopkins Univ. *Am. Chem. J.*, 46, 621–37.—The authors give at some length their difficulties in the prep. of pure aniline hydrochloride and its use in soln. as the electrolyte in H cells. From their measurements of the e. m. f. of such cells they were able to calc. the degree of hydrolysis of the salt. The result is affected largely by the value chosen for the calomel electrode, but using the value calc. from data of G. N. Lewis, the hydrolysis constant $K_w K_b = 0.244 \times 10^{-4}$ is in good agreement with that found by Tizard and Bredig. The % ionization of HOAc detd. from e. m. f. measurements was higher than that given by cond. methods and differed by 10%, depending on the soln. used to eliminate diffusion potentials, NH_4NO_3 giving higher values than KCl. The expts. to det. the effect of neutral salts in the ionization of HOAc were indefinit; the measurements using NH_4NO_3 as intermediate soln. showed a decrease, while those with KCl showed an increase in the degree of dissociation. PAUL V. FARAGHER.

Difficulties in the Use of the Hydrogen Electrode in the Measurement of the Concentration of Hydrogen Ions in the Presence of Organic Compounds. L. J. DESHA AND S. F. ACREE. Johns Hopkins Univ. *Am. Chem. J.*, 46, 638–48.—Aniline hydrochloride and similarly some other organic compds. are decomposed in the presence of Pt, especially if any O be present. The e. m. f. may thus not give a true measure of the H^+ conc. (In most cases the time required for the cell to give constant values can be cut down to 5 or 10 mins. by first satg. the Pt electrode with H gas; if this is not done about 30 mins. are required.) NH_4NO_3 is found to be unsatisfactory in eliminating diffusion potentials. PAUL V. FARAGHER.

Equilibrium in the System: Potassium Iodide, Iodine and Water. CHARLES L. PARSONS AND C. F. WHITTEMORE. New Hampshire Coll. *J. Am. Chem. Soc.*, 33, 1933–6; *C. A.*, 5, 238.—Presents the results of a series of expts. on the mutual solubility of KI and I_2 in H_2O with special reference to solns. highly conc. with respect to both substances. The conclusion is drawn that no solid polyiodides exist at 25°. PAUL V. FARAGHER.

Distillation of Binary Mixtures of Metals in Vacuo. I. Isolation of a Compound of Magnesium and Zinc. ARTHUR JOHN BERRY. Downing Coll., Cambridge. *Proc. Roy. Soc. London*, (*A*) 86, 67–71; cf. Heycock and Neville, *J. Chem. Soc.*, 61, 914 (1892).—Mg together with excess of Zn was placed in a Jena glass tube, which was thoroughly evacuated (finally with cold charcoal) and sealed off. The tube was then heated for 6–7 hours, being arranged so as to allow the distillate to condense and separate from the residual alloy, in which finally the Zn was detd. volumetrically. The residual alloy always contained some Si, formed by the action of Mg on the glass at high temps.; but the at. proportions of the two metals corresponded always very closely to the formula $MgZn_2$. The alloy of minimum vapor pressure is consequently the definit compd. $MgZn_2$, which is quite stable under the conditions so far investigated. In 2 expts. a cryst. distillate was obtained in one portion of the tube (in addition to the distillate of Zn condensed in the colder region); analysis showed that it also was the compd. $MgZn_2$, demonstrating that the binary metallic compd. was distilled without decomp. J. JOHNSTON.

Reinvestigations of the Velocity of Sugar Hydrolysis. M. A. ROSANOFF, R. H. CLARK AND R. L. SIBLEY. Clark Univ. *J. Am. Chem. Soc.*, 33, 1911–24.—Expts. in which mannitol, glucose, etc., were introduced in place of more or less of the cane sugar, the concs. of acid and water remaining unchanged, showed that the velocity coeff. is independent of the initial conc. of the sugar itself; and that the constancy of the velocity coeff. during the reaction is not due to any specific effect of the invert

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sugar which gradually replaces the sucrose in an ordinary single expt. The velocity coeffs. of Armstrong and Caldwell and of Julius Meyer, when recalc. by use of new values of α_0 obtained by the method of least squares, agree with those of the authors in demonstrating that sugar hydrolysis proceeds in accordance with the law of mass action and is a reaction strictly monomol. with respect to sugar. Other expts. indicated that the variation of the sp. rotatory power of fructose is due to the varying H_2O content of the solns. employed. H. S. PAINE.

Adsorption in Solutions. II. The Dualistic Nature of Adsorption Phenomena. G. v. GEORGIEVICS. Prague. *Monatsh.*, 32, 1075–87.—The speed with which absorption equil. is reached depends not only on the nature of the adsorbing and adsorbed substances, but as well on the conc. of the soln. used, the speed being greater for more conc. solns. Results of many adsorption expts. show that the root exponent in $\sqrt[x]{c_1/c_2} = K$ decreases in value with increasing diln. of the solns. Expts. on adsorption by wool of HCl and H_2SO_4 in concs. as small (0.028 g. HCl and 0.04 g. H_2SO_4 per l.) as could with appropriate corrections be titrated with phenolph. as indicator, showed that the root exponent becomes practically unity, c_1/c_2 being constant up to concs. of 0.20 g. HCl or H_2SO_4 per l.; the ordinary exponential expression thus coincides (analogous to the adsorption of gases) with Henry's law for these dilns. It is concluded from this that H_2SO_4 and HCl are dissolved in the substance of the wool; the relative "solubilities" of the 2 are, resp., 9 : 7. In the most dil. solns. there occurs only soln. of the acid by wool, while in more conc. solns. both soln. and adsorption take place. In an expt. with picric acid and silk there was evidence that soln., adsorption, and chem. action were all concerned. H. S. PAINE.

The Absorption of Hydrogen by Palladium at Low Pressures and Temperatures. S. VALENTINER. Clausthal. *Ber. physik. Ges.*, 1911, 1003–22.—Careful measurements were made of the amt. of H absorbed by a given mass of Pd at 3 different temps.; namely, the temp. of liquid air, the temp. of a mixture of solid CO_2 and alc., and room temp. The results show that the absorptive power of the Pd increases enormously with decrease in temp. For example, the pressure at which 1 mg. H is absorbed by, and hence in equil. with, 1 g. Pd, at —78°, is 0.025 mm. and at —190° 0.001 mm. It is also noticeable that, especially at the temp. of liquid air, the absorption at low pressures increases considerably as the pressure is raised. The bearing of these results on the question of the mechanism of the absorption of H by Pd is discussed and the conclusion reached that the absorption is conditioned by both soln. and surface condensation. L. H. ADAMS.

Colloids and their Importance. HANS FREIMANN. *Z. angew. Chem.*, 24, 2420–6. —General. GEORGE W. MOREY.

Radiation in Explosions of Coal Gas and Air. W. T. DAVID. Trinity Coll., Cambridge. *Trans. Roy. Soc. London*, (A) 211, 375–410; *Proc.*, (*A*) 85, 537–41 (Abstract); cf. *C. A.*, 6, 148.—The first part of the paper is an account of expts. on the radiation emitted by coal gas-air mixts. during explosion and cooling. With gas-air mixts. in varying proportions at atm. pressure the total ht. lost by radiation to the walls up to the moment of max. pressure is approx. equal to the 3rd power of the max. abs. temp. produced. The total ht. lost by radiation during explosion and cooling is about 25% of the ht. of combustion of the gas. The radiation in the initial stage of cooling is a function of both the time interval from ignition and the temp. The time at which the rate of radiation is a max. is before the attainment of the max. pressure, and is probably when the flame fills the explosion chamber. About twice as much ht. is radiated by CO_2 as by H_2O vapor at the same temp. With experimental mixts. of the same strength but different d. the ratio of the ht. lost by radiation up to the moment of

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max. pressure to the ht. of comb. decreases with increasing d., but the denser mixts. emit more strongly at the instant of max. pressure and in the initial stages of cooling. The 2nd part of the paper is an account of expts. on the diathermancy and emissive power of the hot gaseous mixts. after explosion. GEORGE W. MOREY.

Phenomena of Polarization of Light in Solid and Pseudo-liquid Organized Matter. P. DE HEEN. *Bull. acad. roy. belg.*, 1910, 23–30.—Matter is regarded as composed of ionic filaments traversed by magnetic currents or currents of ether (*i. e.*, not necessarily elec. currents); all the phenomena of polarization are considered to be the result of the orientation of these filaments or of the predominating action of certain orientations (polarization by reflection and by refraction). In an optically active substance all the at. bundles are supposed to be "wound" in the same sense, while in order to obtain a magnetic field the sense of the winding is immaterial, but it is necessary that the sense of the magnetic currents should be the same. H. S. PAINE.

Appearance of Starch Grains in Polarized Light. A. BOUTARIC. *J. physique*, [5] 1, 891–6.—The black cross observed when a starch grain is examined microscopically between crossed analyzer and polarizer and the phenomena produced when a thin plate of quartz is interposed may be explained from considerations of symmetry if the starch grain is assumed to be spherical and all the diams. play the same role. A ray traversing any diam. whatever may be resolved into 2 components whose vibrations experience a total retardation δ—δ' (where δ is the retardation parallel to the diam. and δ' that perpendicular to the same) proportional to the thickness traversed, and which on emerging give light elliptically polarized; if now a cryst. plate cut parallel to the axis be interposed and oriented in a plane perpendicular to the rays, the retardation impressed by the starch grain will be added to that of the cryst. plate along the diam. parallel to the axis and deducted from that along the perpendicular diam. According to the theory of chromatic polarization the luminous intensity will be nil for $\phi = 0$ or $\pi/2$ (ϕ = angle formed by intersection of the optical axis, *i. e.*, diam., at the point considered with the principal section of the polarizer) and max. for $\phi = \pi/4$. For points on the same diam. ϕ is constant and δ increases with the thickness so that the color observed rizes in the color scale as the center of the grain is approached. The same considerations hold for certain minerals, the spheroliths, which may be regarded as composed of aggregations of small crystals symmetrically located around a center. H. S. PAINE.

Phosphorescence. W. E. PAULI. *Physik. Z.*, 13, 39–46.—A review. J. J.

Variations in Conductivity of a Phosphorescent Substance under the Action of Light. P. VAILLANT. *Compt. rend.*, 153, 1141–4.—Under the influence of light the elec. cond. of CaS increases to a max., after which it slowly decreases. The max. is greater the greater the intensity of illumination. When the source of illumination is removed the cond. first increases rapidly, then decreases. The decrease is rapid for a few minutes, uniform and slow for a longer time, finally much slower and irregular. GEORGE W. MOREY.

The Action of Ultraviolet Rays on Sodium Thiosulfate. L. MARMIER. *Compt. rend.*, 154, 32–3.—Solns containing <6 g. $Na_2S_2O_3$ per l. yield, after 5 min. exposure to the ultraviolet rays, S and $Na_2S_2O_4$. The latter in turn is decomposed and after 75 min. only a trace remains, the soln. containing chiefly Na_2SO_3. With concs. >6 g. per l. no $Na_2S_2O_4$ was formed. J. C. HOSTETTER.

Results of Photoelectric Measurements made at Antibes during 1911. G. RAYMOND. *Compt. rend.*, 154, 45–7.—The active radiations were received on a Zn amalgam (1.5%) and the activity measured by the time of discharge of a negatively charged electroscope. The data show that the active radiation is a function of the height of

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the sun; thus giving a minimum of photoelec. action in Jan. and a max. in July. The clearness of a day is no indication of the amt. of active radiation as high activities were frequently obtained on cloudy days and low activities on clear days.

J. C. HOSTETTER.

Inertia of Selenium Cells. B. GLATZEL. *Ber. physik. Ges.*, 1911, 778–92; *Physik. Z.*, 12, 1169–75.—The behavior of intermittently illuminated Se cells was investigated with the aid of an oscillograph. The form of curve obtained is in general agreement with theoretical considerations advanced by the author. An element prepared as follows was found to show no hysteresis effect: Se was deposited, by vaporization, in a very thin film on Pt foil; this, after being sensitized, formed one of a pair of electrodes dipping into dil. H_2SO_4. Such an element can give relatively strong currents, and hence is superior in that respect to photoelectric cells, which likewise exhibit no hysteresis. J. JOHNSTON.

The Recovery of the Giltay Selenium Cell and the Nature of Light Action on Selenium. F. C. BROWN. Univ. Iowa. *Physic. Rev.*, 33, 403–20.—Detns. were made of the change of cond. of the Se (in a cell made by Giltay) during, and after, exposure of different durations to light of various intensities. The results agree fairly satisfactorily with the author's theory (*C. A.*, 6, 20). It appears that temp. action in the Giltay Se cell is essentially the same as light action, but not identical with it.

J. JOHNSTON.

The Fatigue of Metals Subjected to Röntgen Radiation, in the Presence of Chemically Active Gases. EDWARD G. RIEMAN. Univ. Cincinnati. *Physic. Rev.*, 33, 433–41.—Metals subject to Röntgen rays suffer changes of secondary radiation similar to that found with metals acted on by ultraviolet light; this action has been designated by the term fatigue. It had previously been found that chem. change of the surface was necessary in order to have fatigue take place. Polished surfaces of Fe, Cu, Sn, Pb, Zn and Al were tested in various gases. Al showed no appreciable change in O. Old oxide surfaces, stable so far as fatigue in O is concerned, show decided fatigue when tested in Cl. Fatigue was found for all the metals in contact with Cl, Br, HNO_3, H_2S and HCl; but no relation between the amt. of fatigue and the corresponding activity of chem. action between gas and metal could be found. J. J.

Optical Dispersion: A Comparison of the Maxima of Absorption and Selective Reflection for Certain Substances. T. H. HAVELOCK. Armstrong Coll., Newcastle-on-Tyne. *Proc. Roy. Soc. London*, (*A*) 86, 1–14.—Using dispersion formulas of a general type, an expression is found for the position of the max. of κ, the coeff. of extinction; further, a quartic equation is obtained, 3 of whose roots give the max. of $n\kappa$, and the max. and minimum of n. These equations are applied to iodoeosin, CS_2, rock salt and Na vapor. It is found that the max. of selective reflection is in general displaced from the position of max. absorption, especially in the infra-red. J. J.

Influence of the Solvent on the Position of Absorption Bands in Solutions. T. H. HAVELOCK. *Proc. Roy. Soc. London*, (*A*) 86, 15–20.—A definit formulation of Kundt's rule—that the effect of the solvent is to displace the absorption bands further towards the longer wave lengths, the greater the refractive or dispersive power of the solvent based on a particular type of dispersion formula. J. JOHNSTON.

Spectrum of Boron. WILLIAM CROOKES. *Proc. Roy. Soc. London*, 86, (*A*) 36–41; with 1 plate; *Chem. News*, 105, 1–3.—Photographs of the spark spectrum of various samples of B were made and compared with the Fe spectrum. It was found that the spark spectrum of B consists of 3 lines only, of wave lengths 3451.50, 2497.83, 2496.89 referred to Rowland's latest measurements of the Fe spectrum. The measurements

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of these 3 lines accord well with previous detns., but the author was unable to confirm the existence of some other lines previously attributed to B by other investigators.

J. JOHNSTON.

Separation of the Spectral Lines of Calcium and Strontium in the Magnetic Field. B. E. MOORE. Univ. Nebraska. *Physik. Z.*, 12, 443–5.—Presents the results of a thorough investigation of the behavior of the lines of Ca and Sr in the magnetic field; from which it appears that Preston's law is not followed in the majority of cases.

J. JOHNSTON.

Series-systems in the Spectra of Zinc, Cadmium and Mercury. F. PASCHEN. *Ann. Physik*, 35, 860–80.—A spectro-photographic investigation of the spark spectra of Zn and Cd and of the arc spectrum of Hg in a quartz tube, was undertaken using refined methods and app. In the case of all 3 elements principal series of simple lines were found which belong to subordinate series already discovered. A study was also made of the magnetic resolution of several lines. It is noteworthy that, within this group, with increasing at. wt. there is an increasing tendency toward the formation of combinations of lines.

L. H. ADAMS.

The Dispersion of Quartz in the Ultra-red. F. PASCHEN. *Ann. Physik*, 35, 1005–8.—Formerly it was not possible to det. refractive indices in the ultra-red to better than 1 or 2 units in the fifth decimal place, on account of the error introduced by the comparison of the ocular with the bolometric setting; but by making use of the accurate measurements of ultra-red wave lengths made by P. (*C. A.*, 3, 1241, 2525) it is now possible to use ordinary optical methods in the ultra-red regions, and make all settings bolometrically. By this method P. has measured in the ultra-red n for quartz in the direction of the axis, using a quartz prism, and has obtained results which he considers accurate to a few units of the 6th decimal place. L. H. ADAMS.

The Accurate Measurement of Wave Lengths in the Ultra-red. F. PASCHEN. *Ann. Physik*, 36, 191–7.—Biske has recently advanced the opinion that bolometric measurements in the ultra-red are subject to a certain error. P. shows both theoretically and experimentally that in the case of his own earlier measurements this error was exceedingly small. New detns. of a He- and of a Hg-line lead to the conclusion that the earlier measurements were correct to a few tenths of an Ångström unit.

L. H. ADAMS.

The Intensity Relations of the Series Lines of Hydrogen in the Canal-ray Spectrum. FRITZ LUNKENHEIMER. Univ. Würzburg. *Ann. Physik*, 36, 134–52.—In order to settle the debated question as to whether the intensity relations of the H lines in the canal-rays spectrum is dependent on the velocity of the light-emitting particles, L. has carried out photographic, as well as subjective, photometric measurements of H canal rays. It was found that the relative intensity of the various H lines was dependent on the gas pressure, but not on the velocity of the rays. L. H. ADAMS.

Behavior of Canal Rays in Potassium, Rubidium and Cesium. E. GOLDSTEIN. *Physik. Z.*, 13, 6; *Ber. physik. Ges.*, 1911, 972–3; cf. *C. A.*, 5, 839.—The cell consists of a wide tube containing the cathode, where the canal rays are formed, connected by a narrow tube with a tube which contains the metal. It is surrounded by a heating jacket which is heated until the metal is vaporized. A liquid-air tube is attached to the cell, which absorbs the carboniferous vapors. The canal rays are yellow-red in Rb; greenish white with light blue streaks in Cs; yellow-red in K, but differing somewhat from those in Rb. The spectra of canal rays show the bright lines of the resp. 3 original spectra with their concordant series of lines. It is of practical interest that the tube does not become blackened with use, so that one is able to make spectroscopic observations of the spectra and Doppler effect for these metal vapors.

D. W. CORNELIUS.

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Resolution of the Spectrum Lines of Lanthanum and Cobalt in a Magnetic Field. STEPHEN RYBÁR. Göttingen. *Physik. Z.*, 12, 889–900.—The results, which are presented is a series of tables, show that there is great similarity in the effect of a magnetic field on the spectra of La, Y, and Ba, corresponding to the chem. similarity of these elements. J. JOHNSTON.

Anomalous Magnetic Rotation Dispersion and Selective Absorption. G. J. ELIAS. Berlin. *Ann. Physik*, 35, 299–346; cf. *C. A.*, 5, 2353.—The measurements recorded show that there are always anomalies in the magnetic rotation dispersion in the neighborhood of absorption bands. Detailed results are presented for aq. solns. of the nitrates of Pr, Nd, Sa and Er, of $KMnO_4$ and $CoCl_2$, and for liquid air and U glass. J. JOHNSTON.

Flow of Oil through Pipes (ERBICEANU). 22. Conductivity of Copper Sulfate and Sulfuric Acid Mixtures (RICHARDSON, TAYLOR). 4. Capacities of Valve Films (SCHULZE). 4. Active State of Chlorine (KÜMMELL). 4. Ionizing Energy of an Electron (BISHOP). 3.

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3. RADIOACTIVITY.

HERMAN SCHLUNDT.

The Quantity of Radium Emanation Disengaged by one of the Springs at Colombieres-sur-Orb, Hérault. JACQUES DANNE AND VICTOR CREMIEU. *Compt. rend.*, 153, 870–1.—A detn. was made of the activity of the gases given off from each of the 3 springs at Colombieres-sur-Orb. One of these, the Cremieu spring, is remarkable on account of the large quantity of gas spontaneously evolved, amtg. in 24 hrs. to 43,000 l. The activity of this gas is due to Ra Em. of which there is contained in 10 l. an amt. equal to 0.2 mg.-min. The quantity of Em. given off by the spring in 24 hrs. is consequently 860 mg.-min. The spring is thus a veritable mine of Em., and since the gas consists of about 95% CO_2 the conc. of the Em. can be increased to a large extent very easily. W. H. ROSS.

Researches on the Radioactivity of the Waters of Vals-les-Bains. CHASPOUL AND JAUBERT DE BEAUJEU. *Compt. rend.*, 153, 944–6.—The gases given off from the springs of Vals, as well as the waters of the springs, owe their activity to Ra Em. No general relation appears to exist between the radioactivity of the waters and the mineral constituents, but in those springs which contain $NaHCO_3$ the radioactivity of the water varies in the same sense as the free CO_2. W. H. ROSS.

The Ratio between Uranium and Radium in Minerals. II. RUTH PIRRAT AND FREDERICK SODDY. Univ. Glasgow. *Phil. Mag.*, 21, 652–8.—The mean Ra–U ratio for Joachimsthal pitchblende was 3.15×10^{-7} in good agreements with Gleditsch's results (cf. *C. A.*, 5, 3757). A sample of thorianite gave a mean value of 6% higher than the pitchblende, other values slightly less, so that Gleditsch's high results for thioranite are not confirmed. Values for different autunites varied from 20 to 74% of the pitchblende result. The results do not support the idea that the life period of ionium may be sufficiently long to cause the equil. ratio of Ra to U to be less in a geologically recent mineral like pitchblende than in an ancient mineral like thorianite. A. T. CAMERON.

Study of the Radioactivity of the Mineral Waters of Fornello and Fontana in the Port of Ischia and of Manzi in Casamicciola. O. SCARPA. *Atti del r. ist. d'incoragg. di Napoli*, [6] 1910, 3–36.—All of the mineral waters in the Isle of Ischia contain Ra Em. A table is given showing the name and temp. of the springs, with the quant.

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of Ra Em. contained in a l. of water. The temp. varies from 50.5° with the Fornello giving 1.09 mg. Em. per l. to Grotto Manzi, 84° and 0.026 mg. per l.

F. W. SMITHER.

The Existence of Thorium Emanation in the Thermal Waters of the Port of Ischia. O. SCARPA. *Atti del r. ist. d'incoragg. di Napoli*, [6] 1910, 199–200.—By a series of carefully conducted expts. the presence of Th Em. was proved (cf. preceding abstr.).

F. W. SMITHER.

Probability Variations in Distribution of Alpha Particles. E. C. SNOW. London. *Phil. Mag.*, 22, 198–200.—An application of Karl Pearson's ideal frequency curves to Rutherford and Geiger's experimental results (*C. A.*, 5, 1231). Their conclusion that the variation in number of α particles from instant to instant is not greater than would be expected in a radium distribution is not controverted. A. T. CAMERON.

The Rate of Evolution of Heat by Orangite. H. H. POOLE. Trinity Coll., Dublin. *Phil. Mag.*, 23, 183–92.—Lumps of orangite from 2 cm. diameter downwards (48 g.) were placed in a thick-walled air-tight Cu vesesl; this was then exhausted, placed inside 2 Dewar vessels and the whole buried in ice. The difference of temp. between the Cu vessel and ice was measured by a multiple thermocouple. In the center of the former was a coil of wire; by passing a small current through this a known amt. of heat was generated inside the Cu vessel; from the ratio of the temp. differences with and without this elec. heater the rate at which the orangite generated heat was calc. The first set of observations extended over a period of 46 days. Neglecting certain temp. variations, due to some unexplained cause, it was found that the mean evolution of heat was 25.4×10^{-5} cal. per hr. per g. A yr. later a 2nd series of observations lasting a month were made with the unaltered app. The mean value for this was 19.4×10^{-5} cal. The mineral was from Arendal, Norway, and contained 36% Th. Pegram and Webb's figure for ThO_2 in equil. is $2.1 + 10^{-5}$ cal. per hr. per g., which is much nearer the values deduced from theory than those found for orangite. During exhaustion the orangite has been warmed and had lost a small amt. of water. It is suggested that during the expts. it was therefore undergoing some mol. or chem. change and that this was proceeded at almost the same rate a yr. later. A. T. CAMERON.

The Emission of Electrons by Metals under the Influence of Alpha Rays. H. A. BUMSTEAD. Yale Univ. *Am. J. Sci.*, 32, 403–17.—The emission of electrons by Al and Au foils under the influence of α-rays varies with the spread of the α-rays in a manner entirely analogous to the variation in the gaseous ionization produced by α-rays. The emission at first increases and then rapidly decreases as the α-rays near the end of their range, and the curves obtained show all the characteristics of the ionization curves in gases first obtained by Bragg. The curves lie to the left of the corresponding curves for gases and have a less conspicuous "knee." Thus far they are in agreement with the known results on the retardation of α-rays by metals, and with the hypothesis that the loss of energy by the α-particles is due to an ionization of the metallic mols. But this view is not supported by the close similarity found in the behavior of Au and Al. The agreement in the curves obtained for these metals was unexpected, in view of the dissimilarity in the ionization curves of different gases, and gives rise to the suspicion that the observed effects may not be due to the metals themselves, but perhaps to a layer of adsorbed gas in both cases. The matter is to be investigated further. W. H. ROSS.

An Absolute Determination of the Minimum Ionizing Energy of an Electron, and the Application of the Theory of Ionization by Collision to Mixtures of Gases. EDWIN S. BISHOP. Univ. Chicago. *Physic. Rev.*, 33, 325–53.—The theory of ionization by collision was verified for pressures as high as 40 cm. The min. ionizing energy for a

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gas was found to be const., being independent of the pressure and field strength so long as the latter is sufficiently high to produce new ions by collision. For H, CO_2 and air, these ionizing energies amtd. to 9.66, 6.21 and 10.21 volts, resp. The min. ionizing field strength is directly prop. to the pressure, or X_0/p = const., for pressures at least above 1 cm. The relative ionizing energy of any 2 gases may be detd. (1) by the equation, $\frac{E_1}{E_2} = \frac{X_{01}}{X_{02}} \cdot \frac{L_1}{L_2}$, where E, X and L are the ionizing energy, min. ionizing field strength, and mean free path of the 2 gases; or (2) by the second equation, $\frac{E_1}{E_2} = \frac{V_1}{V_2}$, where V_1 and V_2 are the potentials applied to the positive plate, when the pressures of the 2 gases are in the ratio, $\frac{p_1}{p_2} = \frac{L_1}{L_2}$, and the number of ions n_0 set free at the negative plate, the number of α ions produced by collision in each gas, the mean free path of the electron, and the distance between the plates are the same for both gases. Equations were likewise formulated which made it possible to det. α for any field strength and pressure; to compute the field strength required to produce a given value of n/n_0 for any pressure and distance between plates within the range of the expts., and also to det. the value of n/n_0 for any field strength, pressure and mixt. of 2 pure gases. W. H. Ross.

The Conductivity of a Gas, between Parallel Plate Electrode, when the Current Approaches the Maximum Value. John S. Townsend. Oxford. *Proc. Roy. Soc. London*, (*A*) 86, 72–7.—A theoretical discussion of the relation between current and p. d. between parallel plate electrodes when the gas between the plates has been uniformly ionized by Röntgen or Becquerel rays. J. Johnston.

Fatigue of Metals Subjected to Röntgen Radiation (Rieman). 2.

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4. ELECTROCHEMISTRY.

C. G. FINK.

Electrochemical and Electrometallurgical Developments in Canada. Saul Dushman. *Trans. Am. Electrochem. Soc.*, 20, 419–45.—The first part of a review of the electrolytic refining plant at the Ottawa mint, Pb refining, CaC_2, Fe alloys, cyanamide, graphite, silicon carbide and electrolytic alkali industries of Canada. The second part is devoted to the water power and transportation facilities which are offered with the undeveloped mineral resources including Au, Ag, Co, Cu, Ni, Fe and coal. G. F. Yessler.

Electrochemistry in 1910. H. Borns. *Chem. Ind.*, 34, 705–17, 739–51, 776–86. E. J. C.

Electrochemistry and Metallurgy in Norway. T. H. Norton. *Mining Eng. World*, 36, 407–8. E. J. C.

The Electrochemical Industries of Norway. Joseph W. Richards. *Trans. Am. Electrochem. Soc.*, 20, 403–18; cf. *C. A.*, 5, 3655.—A short description of most of the electrochem. plants in Norway. The industries included are HNO_3, nitrates, nitrites, Na, Al, CaC_2, Ni, Zn, Fe, steel, and Fe alloys. G. F. Yessler.

Aluminium High-tension Conductors. C. B. Smith. *Elec. World*, 59, 107.—1100 miles of stranded Al cable required about 3,000 tons of Al, and, except for very long stretches where Cu-clad steel is sometimes used, it has many advantages. Stringing and tying are less expensive and, in Canada, a large saving in metal cost is effected.

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The Calgary 55,000 v. line, although built under very unsatisfactory conditions of freight and haulage, cost about $2,000 per mile complete. W. E. RUDER.

Electric Furnaces and Refuse Disposal. E. DE FODOR. *Lumière Elec.*, 16, 198–204.—The 6 disposal plants at Frankfurt generated 2,290,143 kw. hrs. in 1910. Other towns are cited and the furnaces and their efficiencies discussed in detail. 1 kg. of garbage may produce 1.5 kg. steam. L. K. MULLER.

Chemical and Physical Reactions in the Production of High Quality Electric Steel. J. GEILENKIRCHEN. *Z. angew. Chem.*, 24, 1948–56.—An address discussing in considerable detail various theories, physical and chem. influences and processes of high grade steel manuf. Gives definitions of "body" in steel and reviews methods of removing P, S, Cu, As, alloyed and occluded gases. G. agrees with L. Bell on the nascent C theory of steel production and with Thallner that crystal elements of low at. conc. characterize good steels. Any process that resolves the various constituents of a steel into atoms and permits recrystn. to a new phys. mol. produces a high quality steel. In a comparison between crucible and elec. steel G. favors the latter and predicts its greatly extended use in Germany. J. S. GOLDBAUM.

Magnetic Properties of Iron at High Frequencies. E. F. ALEXANDERSON. *Elec. Rev. West. Elec.*, 59, 1028–9. C. N. MOORE.

Manufacture of Electrotypes from Copper Molds. J. DIMES. *Metal Ind.*, 9, 381–2.—Cu molds are made by pouring over the surface of the pattern a soln. of I in denatured alc. and allowing to dry; blackleading the surface; waxing the back and edges, and electroplating in a $CuSO_4$ bath (18° Beaumé) containing oxalic acid. The mold is removed from the pattern by means of a knife, and a repetition of the process using the prepared mold as pattern gives an exact reproduction of the original pattern. C. N. MOORE.

Galvanizing. L. POTTHOFF. *Met. Ind.*, 10, 79–82.—A description of some of the latest improvements in cold electro-galvanizing processes. E. J. C.

The Conductivity of Mixtures of Copper Sulfate and Sulfuric Acid. H. K. RICHARDSON AND F. D. TAYLOR. Penn. State College. *Trans. Am. Electrochem. Soc.*, 20, 179–84; *Met. Chem. Eng.*, 9, 536.—The conclusions drawn from the expts. are: 1. Addition of $CuSO_4$ to solns. of H_2SO_4: (*a*) Increases the cond. of the mixt. if the H_2SO_4 is less than 3 g. per 100 cc.; (*b*) has no effect on the cond. of the mixt. if the H_2SO_4 is 3 g. per 100 cc.; (*c*) decreases the cond. of the mixt. if the H_2SO_4 is over 3 g. per 100 cc. 2. The temp. coeff. of mixts. of equal parts $CuSO_4$ and H_2SO_4 appears to be that of the H_2SO_4 alone. 3. The probable error of these detn. is less than 0.5%. G. F. YESSLER.

Stationary and Portable Storage Batteries. H. BECKMANN. *Lumière elec.*, 16, 173–8.—A review. C. N. MOORE.

The Preparation and Cost of Pure Electrolytic Oxygen. F. PETZ. Nüremberg. *Elektrotech. Z.*, 33, 33–6.—A description of the Schuckert electrolyzer: A bell-jar app., with Fe electrodes covered with Fe bell jars, with a 16% NaOH soln. as electrolyte, contained in Fe tanks. The voltage is from 2.5 to 4, and the current can be varied at will without causing the O to contain over 2–4% H, or the H more than 1–1½% O. The Fe anodes are gradually oxidized and require replacing in about 1 to 1½ yrs. Solns. containing chlorides, sulfates, also too high concs. of soln. are to be avoided; these cause too high e. m. fs. Saponifiable additions have an advantageous action. The O and H are purified by passing over H_2O and then through a Ag tube filled with Pd-pumice stone heated to a dull red. The cost of O and H under various assumed conditions is calc. to be 16–26 c. for 1 cu. m. O + 2cu. m. H. R. W. MOORE.

Production of Ozone at a Low Temperature and the Continuous Measurement

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of the Yield. ANDRÉ JOB. *7th Intern. Congr. App. Chem.*, 1909 (*Sec. II*), 143–5; *J. Chem. Soc.*, 100, II, 387. J. J. M.

The Capacities of Valve Films in Molten Salts and in Absolute Sulfuric Acid. GUENTHER SCHULZE. Physik. techn. Reichsanst. *Z. Elektrochem.*, 18, 22.—The rectifying or valve effect is due to the formation and rupture of a very thin film on the surface of the electrode. S. dets. the capacities of Ta and Al films and from these values calcs. the thickness of the films, assuming the dielec. constant to be equal to unity. In aq. solns. the film thickness is approx. proportional to the voltage and independent of the electrolyte but the values are different for different metals. The abs. method of Maxwell heretofore used was not applicable to fused salts; the ordinary Wheatstone bridge method was resorted to. The valve cell was connected in series with a battery and readings of the cell were taken with the full voltage, 81.8, applied. Details and diagrams are given. The app. was tried out on an electrolytic cell of Al in a soln. of citric acid and the values agreed with those obtained by the Maxwell method. The cell has a very low residual current and a comparatively constant capacity which does not alter appreciably upon disconnecting. The capacity values for d. c. corresponded with those for a. c. providing the a. c. voltage was less than the "rupture" voltage of the film. The Ta and Al cells with molten salt electrolyte were the same as those previously described (*C. A.*, 5, 3010). The immersed or active surface was about 2.5 sq. cm. in the case of Ta and 8 sq. cm. in the case of Al. Although the films are formed very rapidly, all comparisons and calcs. are based on measurements made after 30 min. from the start. The voltage was 50 and the frequency 430. The film thickness values found for Ta in the eutectic, 65% KNO_3 + 35% $LiNO_3$, are: 9.17 $\mu\mu$ at 142° with 0.0% H_2O in the salt; 6.93, 140°, 0.55%; 6.37, 135°, 1.05%; 5.59, 135°, 10%; 5.31, 115°, 17%; 5.16, 100°, 25%; 4.10, 100°, 61%; 4.10, 100°, 100%; 4.10, 0°, 100%. The values for Ta in NH_4NO_3 are very similar to these. A change of temp. from 0° to 100° does not affect the thickness, but the presence or absence of H_2O is very marked. The values for Ta and Al in H_2SO_4 are similar to those with molten salts, *e.g.*, Ta in H_2SO_4 —1.5% H_2O (*i. e.*, H_2SO_4 + 7% SO_3) at 0°, film thickness, 6.69 $\mu\mu$; H_2SO_4 + 0.25% H_2O, 6.53; H_2SO_4 + 1.0% H_2O, 5.64; H_2SO_4 + 10% H_2O, 4.28, etc. The thickness in fuming H_2SO_4 is 57% greater than that obtained in hydrated H_2SO_4 for Ta and Al alike. Ta films that have ceased to grow in thickness in dil. electrolytes, will continue to grow upon introducing the electrode into a molten salt, such as KNO_3. In subsequent expts. all salts were heated to 425° and carefully dried over P_2O_5 for several days. A dozen salts, mostly nitrates, were tried. The Ta values are more consistent than the Al. In general, the film thickness increases and the capacity decreases as the m. p. of the salt increases. Above 510° the valve effect seems to disappear entirely. C. G. FINK.

Active State of Chlorine Produced by Light. G. KÜMMELL. Rostock. *Z. Elektrochem.*, 17, 409–12.—As K. had already pointed out that no change in mol. condition takes place when Cl is illuminated, it remained to test the supposition that it becomes ionized under the influence of light. This was done by measurements on the velocity of discharge of a condenser. The app. consisted of a 5 l. gas container lined with Pt foil which was connected to the — pole of the source of current. Within this vessel was an insulated cylinder of Pt foil connected directly with an electroscope placed immediately below the container and charged positively. The light used was that reflected from an arc. The electroscope showed a constant experimental leak with N, H, CO_2 and O, which was independent of whether the gas was dry or moist and illuminated or dark. The same constant velocity of discharge was found with dry Cl. When moist, however, Cl caused a more rapid discharge even in the dark, which was still further accelerated under the influence of light. That this is due to HCl from the reaction, $2Cl_2 + 2H_2O = 4HCl + O_2$, was shown by these two facts: a rapid discharge

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was obtained as the HCl content in air was increased, and no discharge resulted when 20–40% of O was mixed with moist Cl, such as to cause a reversal of the reaction. In those cases where discharge occurred, the Pt cylinder became attacked with formation of H_2PtCl_6. G. R. FONDA.

The Composition and Preparation of Electrodes for Luminous Arc Lamps. E. R. BERRY. *Gen. Elec. Rev.*, 14, 590–1.—The chief constituent of the luminous electrode is a very pure magnetite which serves as the current carrier. TiO_2, in the form of rutile or combined with the Fe, is added, because for the same expenditure of energy Ti produces more light in the arc than any other substance that can be used. Cr greatly prolongs the life of the electrode; this is added in the form of chromite. Great purity of raw materials is essential. The ores are crushed, passed through a magnetic separator and then washed on a Wilfley table. The mixts. are made up according to analyses. The mixt. must be carefully ground so that it will pack well, the finer particles filling the spaces between the coarser. Uniform, fine grinding gives a short life electrode of unsteady operation. The electrodes consist of electrically welded steel tubes, filled with the above mixt. The electrodes are dried at 150° for 24 hrs., then the upper end closed by a moisture-proof, dust-tight seal, covered with a thin Fe disc. to make contact when first starting, and finally giving a coating of oil to prevent rusting. R. W. MOORE.

Flame Arc Lamps. S. H. BLAKE. *Gen. Elec. Rev.*, 14, 595.—Definitions of the open C, enclosed C, open flame and enclosed flame arc lamps are given. The disadvantages of the open flame arc lamp are considered and the steps in developing the enclosed type discussed. The enclosed type averages 4000 hrs. and shows a maintenance cost, not including power, of $10.45 as against $45.01 for the open flame. Deposition on the inner enclosing globe was eliminated by providing a cooling chamber and a limited air circulation, causing all fumes to deposit on the cool walls of the chamber. Instead of an electrode with impregnated core, electrodes were made by homogeneously mixing the sep. salts to be used and then squirting the electrode in 1 piece. This lamp can be made for operation on any com. circuit (at least 60 volt on d. c., and not less than 25 cycles a. c.). Low current values show decreased efficiency. The mechanism follows closely that of the enclosed C arc lamp designed. W. L. V. K.

History of Electric Lighting. CH. MOURLON AND J. REYVAL. *Lumière elec.*, 17, 99–103.—Authors claim that J. B. Jobard, of Bruxelles, was the true inventor of the elec. incandescent lamp (1838). The latter half of the article is devoted to a summary of tests on the drawn-wire Mazda (W) lamp. L. K. MULLER.

Some Factors in Heterochromatic Photometry. LOUIS BELL. *Elec. World*, 59, 201–3.—B. discusses the effect of simultaneous contrast in modifying the apparent luminosities of 2-colored lights under comparison. In an "equality-of-brightness" photometer this effect gives rise to false judgment of the intensities of the 2 lights. Only in the Rood flicker photometer is simultaneous contrast fully eliminated. G. R. FONDA.

Electricity vs. Gas. E. WIKANDER. *Elektrotech. Z.*, 33, 11–3. R. W. MOORE.

The Capacity and Phase Difference of Paraffined Paper Condensers as Functions of Temperature and Frequency. FREDERICK W. GROVER. *Bull. Bur. Stand.*, 7, 495–578.—The capacities and phase differences of 13 com. paper condensers were measured at 10–35° and at frequencies between 30 and 1000 cycles per sec. A discussion of the results in the light of the theories of absorption is given. G. R. FONDA.

Tests for Fibrous Insulating Materials. W. P. DIGBY. Brit. Inst. of Civil Eng. *Met. Chem. Eng.*, 9, 428.—Tests are given for motor and dynamo insulating material. Strips of known area and wt. were exposed to the action of a vapor bath at 75° for

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period saggregating 1 hr. and 40 mins. Wt. and insulation resistance per sq. in. were taken every 20 minutes. "Empire" cloth varies widely under test. The value of using single thickness cloth rather than equiv. thickness secured by 2 or 3 thicknesses of thinner material, was demonstrated. Thin goods varied in test from 10.1 to 11.2 megohms, while thicker goods have tested as high as 5000 megohms per sq. in. "Press-spahn," unvarnished, was useless except for small voltage machines. Thickness seemed to figure little in the results. Tests varied from 0.0001 to 40 megohms. "Leatheroid" was better than "press-spahn." As a potential specification of this substance, D. permits the use of "leatheroid" which, after vapor bath test for 100 min., has an av. insulation-resistance of over 20 megohms per sq. in. and an increase in wt. and thickness not exceeding 5%. The function of all this material is expected to be merely the mechanical protection of the true insulation sheath of mica, etc., from abrasion in the slots. Scattered results are given of dielec. strength test, moisture and volatil matter in the materials and finally a formula expressing the minimum permissible resistance for motors and generators after heat-run to differentiate between high-speed machines with small surface and low-speed generators of large diam.

J. R. WITHROW.

Condensite. ANON. *Elec. Rev. West. Elec.*, 60, 199.—Condensite is produced by the reaction between PhOH and HCHO. The condensation product resulting is freed from water and other impurities, mixed with a hardening element and rendered hard, infusible and insol. by the application of heat. It is transparent and elastic, and can be used for molding and impregnating while in the plastic condition. It is non-inflammable and an insulator for heat. It has a tensil strength of 4000 lbs. per sq. in. and a compressive strength of 22,000 lbs. when cold and 11,000 when hot. It is of high dielec. strength and is punctured only with a voltage gradient of 135–350 v. per mil.

G. R. FONDA.

Chemical Treatment of Water (BULL). 14. Electrostatic Voltmeter (ABRAHAM, VILLARD). 1.

U. S., 1,017,005, Feb. 13. I. LADOFF. **Arc light electrode composed of a titanium alloy and potassium fluotitanate.**

U. S., 1,017,031, Feb. 13. O. WINGAARD. **Making magnetic pole-pieces for electric meters.**

U. S., 1,017,064, Feb. 13. E. C. SMITH and E. L. MARSHALL. **Galvanic battery.**

U. S., 1,017,080, Feb. 13. J. P. CLARE. **Storage battery.**

U. S., 1,017,258, Feb. 13. M. FUSS. **Ozonizing apparatus.**

U. S., 1,017,280, Feb. 13. W. VON BOLTON. **Increasing the ductility of metallic tungsten.**

U. S., 1,017,483, Feb. 13. C. VAN BRUNT. **Making molded conductors from carbonaceous material, pitch and sulfur.**

U. S., 1,017,497, Feb. 13. E. R. BERRY. **Arc light electrode containing carbides of titanium and chromium.**

U. S., 1,017,981, Feb. 20. A. A. LEMETRE. **Electroplating with zinc.**

U. S., 1,018,003, Feb. 20. B. REDLICH. **Carbon electrode.**

U. S., 1,018,332, Feb. 20. F. J. MCELHONE. **Electroplating process.**

Ger., 229,877, Nov. 2, 1909. BR. REICHMANN. Mfg. **carbonaceous, ligneous electrodes** (pocket electrodes) for Leclanché cells.

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Ger., 230,176, Oct. 8, 1908. AMERICAN CIRCULAR LOOM CO. App. for simultaneously **electroplating** the inner and outer surfaces of hollow bodies (cf. U. S. Pat., 899,226).

Ger., 231,280, June 24, 1910. ELEKTRIZITÄTS-AKT. GES. HYDRAWERK. In the manuf. of **fillers for galvanic cells,** employing cane sugar, uric acid, BzOH, AcOH.

Ger., 231,405, Mar. 21, 1909. W. MOSELEY. **Accumulator electrode.**

Ger., 231,507, July 9, 1910. ALLGEMEINES CHEM. LABORATORIUM. Production of **filament supports** for elec. incandescent lamps.

Ger., 231,563, May 12, 1907. THE ATKIN ENGRAVING CO. Mfg. **relief plates** by etching daguerreotype plates. A silver-plated, cleaned, and polished Cu plate is made sensitive to light by exposing it to the vapors of I or I compds. The transfer of the picture to the prepared plate is effected by impressing the negative through a screen upon the plate and exposing it to the action of light. Hg, as developer, serves at the same time as a protection against the etching acid. The picture is fixed with $Na_2S_2O_3$. The plate is then exposed to the action of Fe_2Cl_6, which only attacks the portions not protected by the Hg. After teching for some time the process is interrupted, as a substance forms on the plate which seems to resist the action of the corrosive. The direction of the elec. current is then changed or the Cu plate is removed from the bath and washed, whereby the above-mentioned substance is removed. The etching may then be continued to the desired depth, the plate serving as anode.

Ger., 231,587, Mar. 6, 1909. C. P. ELIESON. **Storage battery plate** composed of several folded Pb sheets.

Ger., 232,219, Feb. 26, 1910. J. CANELLO. In the manuf. of **incandescent electric lamps,** a stem bearing the filaments is cast in the bulb. A middle support is dispensed with.

Ger., 232,261, Dec. 14, 1909. SOC. FRANÇAISE D'INCANDESCENCE PAR LE GAZ (SYSTÈME AUER). **Attaching filaments in electric incandescent lamps** to the filament supports with a putty consisting of a paste of sirup and a fine powder of metal or metallic alloys such as Mo or metals of the Pt group, which sinter together more readily than W. Powdered SiO_2 is also added to the putty. In order to avoid occlusion of gases, powders of fused metals, or alloys stable at high temps., such as the oxides of Mg, Ti, V, or the rare earths, are employed.

5. PHOTOGRAPHY.

LOUIS DERR.

Safe Lights for the Dark Room. A. P. H. TRIVELLI. *Brit. J. Phot.*, 58, 474-7, 494-6, 533-4, 628-31, 777-80, 872-5, 951-3.—An extended study of modern dark-room practice. Colored glass not only absorbs the actinic rays from the source, but a part of the non-actinic as well, red glass, for example, transmitting only about 2% of the light from the source. To improve this condition organic dyes are used. For rapid plates, tartrazine + methyl violet 6B or acid violet 7BN is recommended. Dicyanine, pinachrome and other sensitizers demand quite different filters. A gelatin-coated plate soaked in 1 to 30 brilliant yellow or tartrazine, combined with a similar plate soaked in methyl violet, gives a light safe against ethyl red plates. A green light is: 6% gelatin 500 cc., 4% dark-room safe light green 100 cc., poured on glass plates and dried. Since the discovery of pot-metal ruby, colored glasses have not been improved; they are all inferior to organic dyes in brightness and safety, but have the great advantage of permanence of color. Tartrazine is the best absorbent of violet and blue up to green. Crystal violet has not been superseded. The other dyes are too liable to change, and dry filters are less unstable than aqueous solutions, the best safe light be-

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ing a dry gelatin filter. As a source, daylight is objectionable, the best being a metallic-filament incandescent lamp. The dark room itself should be painted black in the parts from which reflected light can fall upon the plate, and white elsewhere. Tartrazine and malachite-green make a green safe-light available for autochromes and many panchromatic plates. Rapid filter yellow (filter yellow K) is recommended as an energetic absorber of ultraviolet, though it should be used in a separate filter and not in combination with other dyes. Many formulas are given for red, orange, yellow and green filters, with the wave lengths transmitted. L. DERR.

Composition of Photographic Images. A. AND L. LUMIÈRE AND A. SEYEWETZ. *Bull. soc. franç. phot.*, [3] 2, 36–49; *Brit. J. Phot.*, 59, 61–2.—When a gelatin bromide or a bromoiodide plate is developed for a long time in an energetic developer and fixed in hypo the image is not pure Ag, but contains a 3–6% residue insoluble in HNO_3. On bromoiodide plates the residue contains I and S, on bromide plates S only from the fixing bath. With KCN as a fixer the Ag image contains no Br and only traces of I, with a small quantity of a brown product which is probably a subiodide. These results seem to offer an explanation of the differences in the action of the various solvents of the Ag image. L. DERR.

Hypersensitizing Autochrome Plates. C. ADRIEN. *Bull. soc. franç. phot.*, [3] 2, 400–2; C. SIMMEN, *Ibid.*, 403–6.—The former obtains good results with 5 min. immersion in a 1 : 1,000,000 pinachrome bath, and quick drying with $CaCl_2$. The latter advizes 5 min. immersion in a sensitizing bath composed of 66 cc. dist. water, 33 cc. 90% alc., 1.5–2 cc. dye solution, 0.25–0.50 NH_4OH. The dye solution is a mixture of pinaverdol, pinachrome and pinacyanol in alc. 1 : 1000. The color filter is 3 g. hard gelatin, 100 cc. water, 2.5 cc. 1% filter yellow K; poured on glass, 10 cc. per sq. dm. L. DERR.

The Sensitization of Photographic Plates for the Ultra and Infra-red. L. LEWIN, A. MIETHE AND E. STENGER. *Arch. ges. Physiol.*, 142, 403–4.—The use of alizarin blue-bisulfite and nigrosin-B with pinacyanol (Gargan de Moncetz, *C. A.*, 4, 870) for sensitization of plates for the photographing of the absorption spectra in the ultra- and infra-red were without better result than by the use of pinacyanol itself. The latter is of use only within the region of 540–660 $\mu\mu$. W. A. JACOBS.

Ger., 230,964, Mar. 11, 1909. G. BUCKY. **Sensitized plates for Röntgen photography** in day light. The plates are treated in a 5% bath of "red for dark chamber light of the Höchster Farbwerke." After drying the plates can be exposed to the X-rays and can be developed and fixed in daylight. The color is removed by washing in running water within an hr.

Ger., 231,366, June 23, 1910. F. STEINERT. **Magnesium lamp for photographing.**

Ger., 231,562, July 13, 1910. E. HÖFINGHOFF, SR. **Silvering photographic paper.** A double sheet of 2 simple sheets of equal size are glued on the outer edges firmly on top of each other, then immersed in the preliminary prep., and after drying treated in the Ag bath. As only the outside of the sheets come in contact with the bath, the back of the sheets cannot be spoiled by $AgNO_3$.

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6. INORGANIC CHEMISTRY.

H. I. SCHLESINGER.

Investigation of Uranyl Salts. III. Index of Refraction and Specific Gravity of Solutions of Uranyl Nitrate. A. M. VASIL'EV. Univ. Kazan. *J. Russ. Phys. Chem.*

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Soc., 43, 1183–4; cf. *C. A.*, 6, 577.—The % comps. of solns. of $UO_2(NO_3)_2$, n_D and d_{17}^{17} are, resp., as follows: 54.77, 1.41155, 1.7536; 53.91, 1.40843, 1.7480; 52.04, 1.40511, 1.7118; 49.92, 1.39889, 1.6506; 47.94, 1.39714, 1.6155; 44.02, 1.38974, 1.5275; 43.11, 1.38804, 1.5204; 39.73, 1.38272, 1.4669; 37.85, 1.37901, 1.4295; 34.88, 1.37489, 1.3939; 29.77, 1.36758, 1.3247; 25.58, 1.36158, 1.2599; 20.05, 1.35412, 1.1983; 16.96, 1.35041, 1.1625; 14.26, 1.34675, 1.1288; 10.92, 1.34417, 1.1035; 5.73, 1.33869, 1.0510; 2.80, 1.33597, 1.0257. By interpolation of values formerly obtained for the solubility of this salt the comp. of its satd. soln. was found to be $UO_2(NO_3)_2.18.08H_2O$. H. M. GORDIN.

Manganese Arsenides. G. ARRIVAUT. *7th Intern. Congr. Applied Chem.*, 1909 (*Sec. II*), 100–3; *J. Chem. Soc.*, 100, II, 399. J. J. M.

Researches upon the Atomic Weights of Cadmium, Manganese, Bromine, Lead, Arsenic, Iodine, Silver, Etc. G. P. BAXTER, *et al.* *Publ. Carnegie Inst.*, 135, 185 pp. J. J. M.

Passivity of Metals. V. A. KISTYAKOVSKII. *7th Intern. Congr. Applied Chem.*, 1909 (*Sec. X*), 56–7; *J. Chem. Soc.*, 100, II, 401. J. J. M.

Thorium Peroxide. F. CALZOLARI. *Atti r. accad. sci. Torino*, 46, 195–202; *J. Chem. Soc.*, 100, II, 404.—C. has investigated the comp. of the hydrated thorium peroxide which is pptd. when H_2O_2 acts on solns. of Th salts. The method adopted consisted in the estn. of the excess of H_2O_2 and of the liberated acid present in an aliquot portion of the clear soln. after the ppt. had settled. The ppt. obtained by the action of H_2O_2 on $Th(NO_3)_4$ contains for every 2 atoms of Th 3 atoms of active O and 2 equivs. of combined HNO_3. The ppt. which seps. from solns. of $ThCl_4$ contains for every 2 atoms of Th 3 atoms of active O and one equiv. of HCl. From solns. of $Th(SO_4)_2$, ppts. contain for every 2 atoms of Th 2 equiv. of combined H_2SO_4 and either 2 or 3 atoms of active O, according to the conditions. In no case do the active O and liberated acid reach the proportions given by Pisarzhevskii (*Z. anorg. Chem.*, 31, 359–67 (1902)). When to a dilute (about 2%) soln. $ThCl_4$ an excess of 1% H_2O_2 soln. is added, no ppt. forms, but thorium peroxide is present in the liquid in colloidal form. The pure colloidal soln. may be prepared by dialysis. It evolves O on warming, but remains clear; addition of an electrolyte (NH_4Cl) causes pptn. J. J. M.

Rate of Reaction between Potassium Dichromate and Iodide in the Presence of Hydrochloric Acid and of Catalysts. GIUSEPPE KERNOT AND F. PIETRAFESA. *Rend. accad. sci. fis. mat. Napoli*, 1911 (*IIIA*) 275–87; *J. Chem. Soc.*, 100, II, 383.—The rate of reaction between $K_2C_2O_7$, KI and HCl is proportional to the conc. of each of the reacting substances. Under corresponding conditions, the speed of the reaction is more influenced by the iodide than by the dichromate, and most of all by the acid. The authors find by the method of Noyes that the reaction is of the fifth order. Colloidal Pt accelerates the reaction proportionally to its conc., but the effect falls off as reaction proceeds. $FeSO_4$ also accelerated the reaction to an extent proportional to its conc. The effect of a mixt. of colloidal Pt and $FeSO_4$ is rather greater than the sum of the sep. effects. J. J. M.

Heteropoly Acids which Contain Vanadic Acid. WILHELM PRANDTL. Munich. *Z. anorg. Chem.*, 73, 223–38.—The 1,4- hexavanadium-selenites were obtained by treating an alkali vanadate soln. with a 20–25% soln. of SeO_2 in excess. They are finely cryst. ppts. generally sol. in H_2O or excess SeO_2. *Sodium 1,4- hexavanadium-selenite* was obtained as $Na_2H_2V_6O_{17}.4H_2SeO_3$, yellow to brown microscopic prisms; $Na_2H_2V_6O_{17}.4SeO_3.2H_2O$, dark red prisms; $Na_2H_2V_6O_{17}.4H_2SeO_3.6H_2O$, voluminous ppt. *Potassium 1,4-hexavanadium-selenite* and *ammonium 1,4-hexavanadium-selenite* were obtained in similar forms, both being much less sol. than the Na compds. *Ammonium 1-12-hexa-*

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vanadium-selenite, $(NH_4)_2HV_6O_{17}.12SeO_2.2$ or $4\ H_2O$, brownish red, transparent crystals and potassium 1,12-hexavanadium-selenite, $K_2HV_6O_{17}.12SeO_2.4H_2O$, dark red crystals, were obtained by adding SeO_2 soln. to a suspension of NH_4VO_3 or KVO_3. Numerous previously described salts prepd. by P. and others are assigned new formulas in harmony with the above. GEORGE W. MOREY.

Complex Compounds of Platinum with Organic Selenides. I. E. FRITZMANN. Univ. St. Petersburg. *Z. anorg. Chem.*, 73, 239–55.—The following compds. were prepd, to see whether compds. of the type $PtO_2.2R_2Se$, formed by $PtCl_2$ with organic selenides, exist in 2 isomeric forms, as is the case with sulfides. The α form was generally prepd., together with a little of the β form, by adding 2 mol. R_2Se to 1 mol. H_2PtCl_4 in 4% H_2O soln. at ordinary temp.; the β form in a pure state by dissolving the components at 15° and evapg. *in vacuo*. Both forms were obtained in all cases, the α form being more sol. and darker in color. With Me_2Se, the α form gives orange-red six-sided tablets from $CHCl_3$ soln., m. 163–163.5°. The β form was obtained in S-yellow, microcryst. ppt., m. 163–165°, insol. in organic solvents. With Et_2Se, the α form gives long prismatic needles, m. 55°. One at. Cl reacts more readily with $AgNO_3$ than the other. The β form consists of clear yellow prisms or tablets, m. 73°. It gives $Pt.2SeEt_2.(NO_3)_2$ with $AgNO_3$. With Pr_2Se only the α form could be obtained, large red crystals. With $(C_6H_{11})_2Se$ the α form is sol. in $CHCl_3$ and Et_2O, from which it forms large reddish yellow tablets, m. 97–97.5°. The β form is insol. in Et_2O, sol. in $CHCl_3$, clear yellow cryst. mass, m. 115–6°. With Ph_2Se the reaction takes place slowly. The α form gives red crystals, m. 180°; the β crystals are lighter colored, m. 178–9°. With $(EtSe(CH_2)_3SeEt)$ the α form was not obtained. The β form is clear yellow, m. 176.5°. In this case the insol. portion, dark yellow to brown, m. 176–176.5°, is probably a λ modification. When heated dry to 110° it is transformed into the β form. GEORGE W. MOREY.

Hydrates of Sodium Carbonate. RUD. WEGSCHEIDER. Univ. Vienna. *Z. anorg. Chem.*, 73, 256–8.—W. gives evidence to show that the $Na_2CO_3.2.5H_2O$ of Morel is $Na_2CO_3.H_2O$, and concludes that $Na_2CO_3.7H_2O$ is the only metastable hydrate whose existence is proved. GEORGE W. MOREY.

Tantalum and Columbian Pentafluorides, and the Preparation of Pure Tantalic and Columbic Acids. OTTO RUFF AND EMIL SCHILLER. Hochsch., Danzig-Langfuhr. *Z. anorg. Chem.*, 72, 329–58.—TaF_5 and CbF_5 were prepd. from the anhydrous chlorides by treatment with HF, b. off the HCl and excess HF, and sepg. from the oxides by distillation. TaF_5 forms colorless crystals m. 96.8° (corr.), b_{760} 229.2–229.5° (corr.), d_{18} 4.981, $d_{19.5}$ 4.744. CbF_5 forms colorless crystals, m. 75.5° (corr.), b_{760} 217–20 (corr.), d_{18} 3.2932. The v. p. of both TaF_5 and CbF_5 was detd. by Smith and Menzies' method, using a Cu app. and liquid paraffin. The reactions of both compds. with a large no. of reagents is given. The solubility of TaF_5 and CbF_5 in solns. containing varying amts. of HF and KF was detd. and on the basis of the results obtained procedures for both the qual. and quant. sepn. of the 2 are given. The solubility of both TaF_5 and CbF_5 decreases with increasing KF and decreasing HF conc., and increases rapidly with the temp. For the sepn. of Ta and Cb from Ti, the best method was found to be distillation of the chlorides, prepd. with Cl + CCl_4. The methods proposed by Weiss and Landecker (*C. A.*, 4, 432) proved worthless. Ta_2O_5 is not volatilized by ignition with HF or NH_4F, as stated by Rose, no acid fluorides of Ta or Cb are formed and $CbOF_3$ is not formed by fusion of Nb_2O_5 and $CaCl_2$ in HCl, as stated by Joly. GEORGE W. MOREY.

The Symmetry of Potassium Dichromate Crystals. A. SHUBNIKOV. Univ. Moscow. *Z. Kryst. Min.*, 50, 19–23.—Solns. of $K_2Cr_2O_7$ were found to be stable up to a supersatn. of 3 (3 g. excess of solid per 100 cc.). Fragments of crystals were introduced

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into such solns. in stationary and in rotating crystn. vessels. In the former, owing to the action of gravity, the size of a face depends largely on its inclination to the horizontal face, (here 001). Crystals without center of symmetry will then develop approx. equal. numbers of 2 habits of crystals which are mirror images of one another. In the latter, the true symmetry will at once be evident in the habit. Both methods showed $K_2Cr_2O_7$ to belong to the triclinic-pedional (asymmetric) class. E. T. WHERRY.

Chemico-crystallographic Contributions. L. WAGNER. Nürnberg. *Z. Kryst. Min.*, 50, 47–56.—Phosphonium iodide is tetragonal with 110, 001, 111, and 101; sp. gr. 2.860. $P(CH_3)_4I$ is also tetragonal, with 110, 101, and 001; $c = 0.7310$; sp. gr. 1.746. Comparison of the topic parameters of the latter with $N(CH_3)_4I$ shows that the replacement of N by P expands the structure about equally in both directions. Sr formate is rhombic-bisphenoidal, with $a : b : c = 0.7846 : 1 : 0.8292$, and sp. gr. 2.693, essentially isomorphous with Ca formate, except that this is bipyramidal. Mix-crystals between these and the Ba salt were obtainable, however, so that the 3 are isotrimorphous. Anhyd. oxalic acid is rhombic-bipyramidal with $a : b : c = 0.8301 : 1 : 0.7678$ and sp. gr. 1.900. Nitrobenzene is monoclinic, $a : b = 1.281 : 1$, $\beta = 117° 21'$. E. T. WHERRY.

Chromi- and Ferri-acetates. R. WEINLAND. Tübingen. *Chem. Ztg.*, 35, 1096–7.—Cr is capable of forming a considerable number of acetates which are mostly basic and are characterized by the fact that the AcO group is only partly ionized. Three series of acetates have been found: 1 of green and 2 of violet compds. *Idem.*, with M. FIEDERER AND P. DINKELACKER.—The green series, of which 3 compds. have been isolated, are most easily prepared: $Cr_3(C_2H_3O_2)_7.(OH)_2$ with 1,4 or $6H_2O$; $Cr_3(C_2H_3O_2)_6(OH).4H_2O$; and $Cr_3(C_2H_3O_2)_9.3H_2O$. In these the cation is $Cr_3(C_2H_3O_2)_6$. The remaining other AcO groups are replaceable by other acids. A number of other salts of this type have been prepared such as the chloride $Cr_3(C_2H_3O_2)_6(OH)_2Cl.8H_2O$, chloroplatinate $Cr_3(C_2H_3O_2)_6.½PtCl_6(OH)_2.5H_2O$, the dichromate acetate $Cr_3(C_2H_3O_2)_6(C_2H_3O_2)(Cr_2O_7).2H_2O$. The base of this series $Cr_3(C_2H_3O_2)_6(OH)_2$ can only be obtained in aq. soln. when $Cr(OH)_3$ or Cr salts of volatil acids (HCl, HNO_3) are heated with excess of HOAc or when glacial HOAc acts on H_2CrO_4 in which part of the latter is reduced and chromates of the bases are formed. *Idem.*, with E. BÜTTNER.—Acetates of one of the violet series are obtained by repeated evapn. of solns. of the green series. Three have been prepared: $Cr_6(C_2H_3O_2)_{13}(OH)_6.24H_2O$; $Cr_6(C_2H_3O_2)_{12}(OH)_6.24H_2O$; and $Cr_6(C_2H_3O_2)_{16}(OH)_2$ with 3 or 6 H_2O. From these the chloride $Cr_6(C_2H_3O_2)_{12}(OH)_6Cl.10H_2O$ and the bromide $Cr_6(C_2H_3O_2)_{11}(OH)_6Br_2.14H_2O$. It is believed that the cation contains 5 AcO groups, the comp. of its base being $Cr_3(C_2H_3O_2)_5(OH)_4$. The formula of the bromide would thus be $\left.\begin{matrix}Cr_3(C_2H_3O_2)_5(C_2H_3O_2)(OH)_2Br\\ Cr(C_2H_3O_2)_3(OH)_2Br\end{matrix}\right\} + 14H_2O$. *Idem.*, with E. GUSSMANN AND E. BÜTTNER.—The second violet series is obtained from the green acetates like the above series, but only after more prolonged treatment. Three have been prepared: $Cr_6(C_2H_3O_2)_9(OH)_9.xH_2O$; $Cr_3(C_2H_3O_2)_{10}(OH)_8.24H_2O$; and $Cr_6.(C_2H_3O_2)_{14}(OH)_4.xH_2O$. Of this series $Cr_3(C_2H_3O_2)_9$ is probably the cation. In all 3 series the Cr is pptd. by NH_4OH only on boiling. The cation of the green series is capable of combining with 3 mols. of pyridine or NH_3 without the sepn. of HOAc, the color changing to pale green. The violet series combine with pyridine. All the Fe salts obtained so far are analogous to the first Cr series or derivs. of the hexa-acetoferri base, $Fe_3(C_2H_3O_2)_6(OH)_3$. The cation $Fe_3(C_2H_3O_2)_6$ of this base is the basis of the $FeCl_3$ reaction for HOAc: $3FeCl_3 + 9NaOAc + 2H_2O \longrightarrow 9NaCl + Fe_3(C_2H_3O_2)_6(C_2H_3O_2)(OH)_2 + 2HOAc$. By the action of pyridine on the ferri-acetates, compds. containing 4 or even 2 atoms of Fe in the ferri-acetate group are produced.

E. J. WITZEMANN.

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Molecular Weight of Lime. Atomic Weight of Calcium. OECHSNER DE CONINCK. *Compt. rend.*, 153, 1479–80.—In four detns. the CaO was obtained by igniting $Ca(OOCH)_2$ and in one detn. it was obtained by igniting CaC_2O_4. The mean of these detns. gave 46.02 as the mol. wt. of CaO, which would require an at. wt. for Ca of 40.02.
EDW. WOLESENSKY.

Solubility of Uranous Oxide in some Acids. A. RAYNAUD. *Compt. rend.*, 153, 1480–2.—The UO_2 was obtained by calcining, in a closed crucible, $UO_2C_2O_4$ which had been purified by several crystns. It was found that this product dissolved with difficulty in even conc. HCl, HBr, H_2SO_4 and $HC_2H_3O_2$. In HNO_3 and aqua regia, however, it dissolves quite readily, forming uranic salts. EDW. WOLESENSKY.

Stability of Zinc Sulfate at High Temperatures (MOSTOVICH). 9. Binary Systems: Ag_2S–FeS and Mn–As (SCHOEN). 9. Solid Oxygen by Evaporation (DEWAR). 2. Active State of Chlorine (KÜMMELL). 4.

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7. ANALYTICAL CHEMISTRY.

E. G. R. ARDAGH.

Advances in the Analytical Chemistry of Non-metals in 1911. A. GUTBIER. *Chem. Ztg.*, 36, 53–4, 66–8, 94–6. E. J. C.

The Evolution of Volumetric Analysis. O. LUENING. Braunschweig. *Apoth. Ztg.*, 26, 702–3. W. O. E.

Principles and Most Important Reactions Underlying Volumetric Analysis. K. FEIST. Univ. Giessen. *Apoth. Ztg.*, 26, 727–8. W. O. E.

Notes on Certain Improved Methods of Technical Analysis. G. J. HOUGH. *Mining World*, 35, 1053.—The paper embodies well-known principles, such as rapid detn. of As and Sb by iodometry; Zn by $KMnO_4$; Bi by $KMnO_4$; qual. sepn. of As, Sb and Sn; detn. of dextrose in glucose or sugar by $KMnO_4$; ash in sugar; CaO and H_3PO_4 in bone-black; and introduces in each case time-saving steps both in process and manipulation. For details the original must be consulted. MACKENZIE WILLIAMS.

Quantitative Handling of Small Precipitates. J. DONAU. *Monatsh.*, 32, 1115–22.—A minute Pt filtering dish is used as described in a previous paper (cf. *C. A.*, 5, 1347). Pt sponge from the ignition of $(NH_4)_2PtCl_6$ is used instead of asbestos. For weighing, a Nernst microbalance gives great accuracy. By an ingenious arrangement of small glass tubes and a bulb for handling the solns. in conjunction with the small Pt filtering dish, ppts. of very small mass can be formed, sepd., and weighed with great accuracy. The analyses of 26 compds. are given and cuts of app. E. W. BOUGHTON.

Electrolytic Determination of Lead in Large and Small Amounts Using a Gauze Cylinder Anode. B. WOICIECHOWSKI. *Met. Chem. Eng.*, 10, 108.—W. gives details for obtaining a good deposit of PbO_2 on a gauze cylinder. In the analysis of lead base babbitts, sep. the Sn and Sb by Na_2S, dissolve the residual PbS and CuS in 10 cc. HNO_3, burn the filter and add ash (dissolved in HNO_3) to the main soln. There should be 45 cc. conc. HNO_3 in 150 cc. soln. Deposit the Pb from b. soln., using 3 amp. at first, then 5 amp. for 20–30 min. Dry the PbO_2 at 230° for 20–30 min. and multiply by 0.8643. When the Pb is less than 10–12% use 10 cc. HNO_3 and 5–6 amp. for 15 min., and dry at 105°. Use 20 cc. HNO_3 if Cu is to be detd. after the Pb. He recommends the Frary solenoid for specially large amts. of Pb. R. A. CUNNINGHAM.

Analysis of Chlorates. v. BUTTLAR. *Chem. Ztg.*, 35, 1374.—v. B. proposes to use suspended $Mg(OH)_2$ instead of $CaCO_3$ to neutralize the soln. prior to the detn.

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by the methods of Fleissner or Grove. Neutralization is instantaneous, no indicator is needed, filtration is unnecessary, and there is no tendency for the soln. to bump during the b. WILLIAM BLUM.

Analysis of Ferrouranium. II. W. TRAUTMANN. *Z. angew. Chem.*, **25**, 19.—A typographical error in a previous paper is corrected (*C. A.*, **5**, 1378). The sepn. of Fe and Al from U by $(NH_4)_2CO_3$ is incomplete. Good results are obtained by using $(NH_4)_2S$ in conjunction with $(NH_4)_2CO_3$. Details of procedure are given. E. W. BOUGHTON.

Modification of the Determination of Nickel by the Ether Method. JOHN P. THOMPSON. Reading, Pa. *J. Ind. Eng. Chem.*, **3**, 950.—H_2O_2 is used as an oxidizing agent in the HCl soln. of the steel, and the ether sepn. then carried out in the usual way, the Ni being finally titrated by KCN soln., using $AgNO_3$ and KI as indicator. F. C. PHILLIPS.

Determination of Manganese in Steel. GORDON L. VON PLANCK. *J. Ind. Eng. Chem.*, **3**, 941.—The addition of a 15% soln. of NH_4SO_4 in place of the dry salt to the HNO_3 soln. of the steel, prevents foaming. By using 5 cc. of $AgNO_3$ soln. containing 4 g. to the l. one can maintain the fluid at a smaller vol. F. C. PHILLIPS.

Colorimetric Estimation of Gold in Cyanide Solutions. WILLIAM BETTEL. *Mining Eng. World*, **35**, 987–8.—B. attributes the errors of the purple of Cassius method for colorimetric detn. to organic matter and to Fe salts. He recommends the use of a Cu–Zn couple, obtained by the action of Zn fume upon a soln. of CuCN in KCN as a substitute for Al powder or Zn fume. The pptn. is rapid and complete, and the color of the purple of Cassius obtained in the soln. of the Au is easily matched with the standard (cf. *C. A.*, **5**, 651). F. C. PHILLIPS.

Rapid Method for Zinc. V. HASSREIDTER. *Z. angew. Chem.*, **24**, 2471.—The method described by Voigt (*C. A.*, **6**, 585) under this title neglects the fact that gelatinous silicic acid in the presence of Zn and NH_4OH retains Zn as silicate. Consequently in the analysis of roasted siliceous blende, calamine and zinc dross, the soln. must be evaporated to dryness and the SiO_2 filtered off; otherwise Voigt's method is inaccurate. E. G. R. ARDAGH.

Method for Separating the Phosphomolybdates from the Silicomolybdates. P. MELIKOV. *Compt. rend.*, **153**, 1478–9.—This method depends on the difference in the solubilities of these 2 substances in an aq. soln. of H_2O_2. When dissolved in this they give rise to permolybdates, and M. has worked out conditions under which the silicomolybdates are insol., while the phosphomolybdates are sol. He mixed equal vols. of a 30% soln. of H_2O_2 and a 8% soln. of $(NH_4)_2MoO_4$ in HNO_3, the latter being equiv. to about a 4% soln. of permolybdate. This mixt. did not dissolve a trace of silicomolybdate but dissolved the phosphomolybdate quite easily. He gives other results confirming this. R. A. CUNNINGHAM.

Fluorescein as Detector of Bromine. H. BAUBIGNY. *Bull. soc. chim.*, **11**, 12–7.—B. defends himself from the criticism of Pribram, who said that the presence of Cl or I spoiled the test, by showing that Cl gives a pale white coloration with fluorescein, while, if the soln. be warmed with $KMnO_4$, the I present is converted into iodate and does not react in the test. In opposition to Labat, who uses fluorescein as a dil. soln., he prefers to use a paper moistened with it. R. A. CUNNINGHAM.

The Rapid Estimation of Carbon Monoxide. LEONARD A. LEVY. *J. Soc. Chem. Ind.*, **30**, 1437–40.—L. devizes app. to make use of the selective oxidation of CO by I_2O_5 (Gautier, *Compt. rend.*, **126**, 793), to give a colorimetric detn. with an accuracy of 0.3% in the hands of a non-technical man. The unsatd. hydrocarbons in the gas examined must first be removed by a strong soln. of Br in KBr, Br vapor and any CO_2

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being consequently removed by KOH. The absorption tube is designed to introduce the least possible hydrostatic pressure. The gas is now dried by passing over P_2O_5 in a tube, and then passed through a double U-tube, the first branch containing I_2O_5 and the 2nd Cu turnings, and both in an air oven at 160–180°. The I liberated combines completely with the Cu. The CO_2 formed is now passed to a decolorization vessel designed to give complete absorption and containing a fixed vol. of stand. $Ba(OH)_2$ colored by phenolph. To this is connected a water aspirator, graduated directly in % CO. Speed of absorption is 200 cc. in 6 mins. when containing 10% of CO.

MACKENZIE WILLIAMS.

Determination of Copper—a Modification of the Iodide Method. E. C. KENDALL. *J. Am. Chem. Soc.*, 33, 1847–52.—To avoid the delay involved in the removal of the HNO_3, K. adds NaClO which oxidizes HNO_2 to HNO_3 with liberation of Cl. The free Cl is then removed by phenol, and after the addition successively of KOH, AcOH and KI, the liberated I is estimated by $Na_2S_2O_3$ in the usual way. For standardizing the $Na_2S_2O_3$ soln. the salt KIO_3HIO_3 is recommended. Numerous results cited indicate a high degree of accuracy. F. C. PHILLIPS.

Determination of Phosphoric Acid. G. JORGENSEN. *Z. angew. Chem.*, 24, 542–4. —A reply to N. von Lorenz (*C. A.*, 6, 584). PERCY H. WALKER.

Separation of Zirconium from Iron and Aluminium; also a New Method of Analysis of Ferrozircon. M. WUNDER AND B. JEANNERET. Univ. Geneva. *Z. anal. Chem.*, 50, 733–5.—Fuse 1 g. of the oxides of Fe, Al, and Zr in a Pt crucible with 6 g. of Na_2CO_3 over a Teclu burner. Take up the fusion with water; add 1 g. Na_2CO_3 (to facilitate filtration of the finely divided ppt.), boil for a few min., filter, preferably through a hardened filter and wash. (If much Al is present, ignite the ppt. and fuse again.) From the filtrate, ppt. Al by NH_4NO_3 (Tcharviani and Wunder, *C. A.*, 5, 2476). Treat the ppt. on the filter with HCl (1 : 1); the Fe goes into soln. and can be detd. Burn the residue on the filter and weigh as ZrO_2. The results are very exact. To det. Fe, Zr, and Si, in Fe-Zr, heat with Br and HCl, drive off Br by treatment with HNO_3 (lest $FeBr_3$ should be lost by volatilization), evap., heat to 110°, take up with dil. HCl, filter, burn ppt. and weigh as SiO_2. From the filtrate, ppt. Fe and Zr (and Al if any) by NH_4OH. Treat the weighed SiO_2 with HF and H_2SO_4, and ignite the residue with the main ppt. obtained by NH_4OH and sep. Fe, Zr (and Al) by the method already given. The process is suitable even with ordinary metallic Zr. JOHN WADDELL.

Estimation of Chlorine in Presence of Hydrochloric Acid. C. E. BOLSER AND J. W. E. GLATTFIELD. *7th Intern. Congr. Applied Chem.*, 1909 (*Sect. I*), 87–8; *J. Chem. Soc.*, 100, II, 435. J. J. M.

Halogenimetry. JUAN A. SANCHEZ. *7th Intern. Congr. Applied Chem.*, 1909 (*Sect. I*), 144–5; *J. Chem. Soc.*, 100, II, 434. J. J. M.

Tungsten in the Black Hills and Methods for its Determination. E. H. QUINNEY. *Mining Sci.*, 65, 45–6.—W is found chiefly as wolframite with some scheelite and more abundantly in the northern Hills, in contact with siliceous Au deposits. Conc. of the ore is necessary. For the detn. of W 3 methods are discussed. F. C. PHILLIPS.

The Reaction between Concentrated Solutions of Barium Acetate and Aluminium Sulfate. J. F. SACHER. *Chem. Ztg.*, 35, 1447.—Buchner (*Ibid.*, 1893, 873) observed that when conc. solns. of $Ba(OAc)_2$ and $Al_2(SO_4)_3$ were mixed, the clear viscous liquid produced deposited $BaSO_4$ only after long standing or upon addition of H_2O. He concluded that there was formed in the soln. a colloidal modification of $BaSO_4$. The present article advances reasons for believing that such a conclusion is not justified, as the phenomenon may be explained from a consideration of the rates of this and

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similar reactions as influenced by high viscosity and low degree of dissociation of the reacting substances. H. M. LANCASTER.

Detection of Arsenic, Phosphorus, and Antimony in the Medical Diagnosis of Poisoning from these Substances. FRANCESCO PEDRAZZINI. *Boll. chim. farm.*, 50, 134; *J. Chem. Soc.*, 100, II, 438.—The suspected substance is treated with Zn and H_2SO_4, and the evolved gas (*a*) is passed into a very weak soln. of $AgNO_3$. Any black ppt. which forms is collected, dissolved in a soln. of tartaric acid, and tested for Sb with HCl. A portion of the filtrate is tested for As by observing whether a crystal of $AgNO_3$ becomes yellow or black when it is placed in the gas (*a*). P is tested for in another portion of the filtrate by means of NH_4 molybdate. J. J. M.

Microchemical Examination of Tannins and Natural Coloring Matters. LUIGI ERMANNO CAVAZZA. *Z. wiss. Mikroscop.*, 27, 34–40; *J. Chem. Soc.*, 100, II, 142; cf. *C. A.*, 3, 168.—An account of expts. on the natural coloring matters contained in plants, which C. tabulates in a list containing 15 groups. The color reactions given with these by various reagents are also appended. J. J. M.

Effect of Grinding on Water of Crystallization (GILLETTE). 2. Fatty Acids (FACHINI, DORTA). 27. Priming Compositions (HAGEN). 24. Nitrogen Testing Apparatus (EVANS). 1.

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8. MINERALOGICAL AND GEOLOGICAL CHEMISTRY.

ROGER C. WELLS.

Review of the Research Work of the Geophysical Laboratory of Washington, D. C. ROBERT MARC. Univ. of Jena. *Z. Elektrochem.*, 18, 2–13.—Review of the numerous papers that have appeared up to the close of 1911 with references to lit. C. G. FINK.

Bertrandite from Iveland, Norway. THOROLF. Christiania. *Z. Kryst. Min.*, 50, 6–13.—Minute crystals of bertrandite occur mixed with phenacite, quartz, muscovite, etc., in pseudomorphs after beryl. They show a new form, 032, and cleavage parallel to *c*, *b*, and *m*. Indices of refraction, (D) are α 1.5914, β 1.6053, γ 1.6145, $\gamma-\alpha$ 0.0231; axial angle $2V_a$ 74° 41′. Analysis gave SiO_2 51.03, BeO 41.45, CaO 0.25, H_2O 7.18, agreeing closely with $H_2Be_4Si_2O_9$, that is, with only $^1/_2$ the amt. of H_2O usually accepted. E. T. WHERRY.

Distinction of Artificial Sapphire and Ruby from Natural. C. DOELTER. Vienna. *Centr. Min.*, 1911, 753.—Crystals of artificial sapphire, owing their color to Ti, become violet on exposure to Ra for several months, whereas natural stones turn yellow. Artificial ruby shows a stronger phosphorescence after exposure to cathode rays than the natural; the latter also becomes temporarily gray on heating in CO. E. T. W.

Experiments in Determining the Crystallizability of Minerals. V. SCHUMOV-DELEANO AND E. DITTLER. Univ. Vienna. *Centr. Min.*, 1911, 753–7.—Minute amts. of the powdered minerals were fused on quartz supports and studied while cooling with a Doelter heating-microscope. The crystallizability, measured by the number of nuclei formed as the temps. decrease, is much greater for spinel, gehlenite, and melilite than, for instance, diopside and aegirite. New m. ps. were detd., as follows (1st, incipient fusion, 2nd, complete fusion): Melanite, 950–1140°; almandite, 1100–1180°; hedenbergite, 1100–1160°; and acmite, 975–1020°. E. T. WHERRY.

A List of New Crystal Forms of Minerals. II. H. P. WHITLOCK. *School Mines Quart.*, 32, 51-92; cf. *C. A.*, 5, 1043. E. J. C.

The Palygorskite Group of Minerals. A. KASAKOV. *Bull. Acad. St. Peters-*

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burg, 1911, 679–84; through *Chem. Zentr.*, 1911, 2, 387.—After carefully and repeatedly purifying, K. obtained the analysis of palygorskites from Stanswik (Finland) and found the following comp.: 1.91 MgO, 1.00 Al_2O_3, 7.39 SiO_2, 10.40 H_2O, or, $H_{20}Mg_5Al_2Si_7O_{30}$. A mineral from the village of Chabarskaja (Gov. of Nishni-Nowgorod) has somewhat the same comp.; 1.89 MgO, 1.00 Al_2O_3, 7.02 SiO_2, 9.59 H_2O. Both minerals are β-palygorskite. J. H. BOWER.

The Mineral Resources of Ontario. THOMAS W. GIBSON. *Trans. Am. Electrochem. Soc.*, 20, 447–54.—A review. G. F. YESSLER.

An Apophyllite-Analcite Bomb from Monte Somma. ST. J. THUGUTT. *Centr. Min.*, 1911, 761–5.—Small milky white to reddish crystals of analcite had the comp. SiO_2 56.27, Al_2O_3 22.24, K_2O 0.04, Na_2O 13.39, H_2O 8.45, sum 100.39, hematite, 0.16 deducted. It has evidently been formed by alteration of Al-leucite by CO_2-bearing waters, the Fe-leucite being simultaneously decomposed, setting free the hematite which colors some of the crystals, and its SiO_2, which, pptd. as opal, clouds the others, and gives rise to part of the excess of SiO_2 shown in the analysis. The rest of the SiO_2 may have come from enclosed wollastonite, etc. The presence of opal in cloudy analcites can be proved by treatment with methylene blue or by boiling with Na_2CO_3; clear crystals show no excess of SiO_2 in their analyses. Clear, greenish crystals of apophyllite occurring in the same specimen gave: SiO_2 52.76, CaO 23.69, MgO 0.05, K_2O 5.14, Na_2O 0.65, F 1.35 (too low), H_2O 16.85, sum (less O = F) 99.92. This and the accompanying calcite has probably been formed by the slow action of H_2O containing CO_2 and KF on wollastonite. The K came from the leucite, but the source of the F is unknown. Celadonite, as an alteration product of augite, is also present, coating the analcite. E. T. WHERRY.

Minerals Accompanying the Ferriferous Deposit of the Buca della Vena near Stazzema (Alpi Apuane). U. PANICHI. *Atti accad. Lincei*, 20, II, 568–71.—Interposed between the calcareous rock and the Fe ore is a reddish brown substance, most of which appears in large cryst. scales with sub-resinous luster and cavernous structure; comp.: CaO, 52.58; FeO, 1.21; MnO, 0.98; CO_2, 43.10; H_2O, 2.46%; d. 2.88; rhombohedron of cleavage, 74° 43′ 20″. The cavities contain calcite partly as brown crystals showing all the combinations of the 2 forms $f = 1\bar{1}1$ $(02\bar{2}1)$, $a = 10\bar{1}$ $(11\bar{2}0)$ and the polar angle of $(11\bar{1})$ about 101° 9′. The whole mass is crossed in various directions by veins of manganite associated with wad. Scattered in the manganite are found magnetite and a siderite bearing Mn; in the wad, hornblende and rhodocrozite.

CHAS. A. ROUILLER.

Remarkable Garnet from Fluminimaggiore (Sardinia). AURELLO SERRA. *Rend. accad. sci. fis. mat. Napoli*, 1910, 222–4; *J. Chem. Soc.*, 100, II, 123.—The garnet was found in association with galena. It has the comp.: SiO_2, 24.53; Al_2O_3, 6.05; FeO_3, 25.10; FeO, 0.84; MnO, trace; CaO, 33.67; total, 100.19, which indicates that it is andradite, in which the silicate $Ca_2Fe(SiO_4)_3$ is associated with $Ca_3Al_2(SiO_4)_3$. It is honey-yellow. J. J. M.

Meteorite Studies. III. OLIVER C. FARRINGTON. *Field Museum of Nat. Hist., Chicago, Geol. Ser.*, 3, 165–93; *J. Chem. Soc.*, 100, II, 407.—*Leighton meteorite:* This stone weighed 877 g., and the structure is that of a breccia-like grey chondrite (Cgb). A partial analysis by H. W. Nichols gave: SiO_2 35.69, Al_2O_3 1.03, Cr_2O_3 0.12, NiO 1.04, CoO 0.08, CaO 1.93, Na_2O 0.95, K_2O 0.47, P 0.40, S 2.11, Fe 10.48, Ni, 1.59, Co 0.21; total, 56.10. The remaining 44% is almost wholly FeO and MgO in approx. equal proportions. *Quinn Canyon Meteorite:* The structure of this large mass of Fe, weighing 3275 lb. is that of a medium octahedrite (Om). Analysis by H. W. Nichols gave: Fe, 91.63; Ni, 7.33; Co, 0.73; Cu, trace; Au, Pt, etc., nil.; S, nil.; P, 0.20; Si, 0.02;

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total, 99.91; The black crust on the meteorite consisted of magnetite. *Composition of Taenite:* 22 published analyses are tabulated; these range from Fe_7Ni to FeNi. *Times of Fall of Meteorites:* 350 recorded falls are tabulated according to year (1800–1909), month, day, and hour. These times differ considerably from the times of meteors and are not noticeably related to any well known star showers. The rate of supply of meteorites to the earth has been remarkably uniform. List of U. S. meteorites is given. J. J. M.

Composition of the Platiniferous Dunite of the Urals. S. PINA DE RUBIES. Univ. Geneva. *Anales soc. espaň. fis. quim.*, 9, 294–308.—Comparison of analyses made by R. of samples of dunite from a no. of deposits in the urals shows that the rock is remarkably uniform in comp. (in contradistinction to the variation in the Pt content), differences between samples from different deposits being no greater than those between samples from the same deposit. The principal differences are in % Al and Cr due to variation in the content of chromite in the dunite. The av. % comp. is: SiO_2, 40.13; Al_2O_3, 0.45; Cr_2O_3, 0.49; FeO, 8.45; MgO, 50.45; TiO_2, 0.03. No trace of Ca was found in any of the samples analyzed which indicates the absence of forms of transition between platiniferous dunite and pyroxenite or olivine. Serpentine found bordering the dunitic deposit was rather uniform in comp. (varying somewhat in % Fe and Cr) and could not be thus distinguished from dunite; on the other hand serpentine obtained from a vein of platiniferous pyroxenite (considered to be completely serpentinized) differed considerably from normal platiniferous dunite in containing a large % of Fe, only a trace of Al and no Cr. The comp. of olivine (of which dunite is almost entirely composed) was calc. from the analytical data, after eliminating Al, Fe, and Cr as Cr_2O_3.FeO and Al_2O_3.FeO, and was found to vary between $Fe_2SiO_4 + 10Mg_2SiO_4$ and $Fe_2SiO_4 + 14Mg_2SiO_4$; $Fe_2SiO_4 + 11Mg_2SiO_4$ may be taken as the type. H. S. PAINE.

Progress of Gold Extraction and its Relation to the Science of Ore Deposits. C. MINNICH. Munich. *Z. prakt. Geol.*, 19, 432–66.—An elaborate summary of the present status of our knowledge of the geology and metallurgy of Au. E. T. WHERRY.

Potassium in Nature. C. MARECHAL. *Chimiste*, 3, 23–4. E. J. C.

The Phosphate Deposits at Es-Salt, in Eastern Jordan Land. P. KRUSCH. Berlin. *Z. prakt. Geol.*, 19, 397–406.—These deposits, analyses of which show a high P content, have been formed in 4 stages: (1) Filling of cracks with apatite material: (2) metasomatic alteration to tri-Ca phosphate; (3) leaching of upper levels by rain water; and (4) dislocation by faulting. E. T. WHERRY.

The Manganese Deposits in the Spanish Province, Huelva. HOYER. Bonn. *Z. prakt. Geol.*, 19, 407–32.—Lens-shaped bodies of Mn carbonates and silicates mixed with pyrite and chert occur interbedded with slates and porphyroids, in close association with extrusive diabase. They are most probably sedimentary or syngenetic, in origin. Analyses show high Mn content. E. T. WHERRY.

The Emission of Water Vapor in Volcanic Eruptions. J. SCHWERTSCHLAGER. Eichstätt. *Centr. Min.*, 1911, 777–82.—Opposing the views of the school of Brun that the gases accompanying volcanic eruptions are chiefly anhydrous chlorides, S. describes close range observations on several active volcanoes, over which the clouds were steam, quite free from HCl, SO_2, etc., although these gases were found to escape on Etna during quiescent periods. E. T. WHERRY.

Determination of the Inorganic Colloid Content of Rocks. Postscript. H. STREMME AND B. AARNIO. *Z. prakt. Geol.*, 19, 467.—For the success of Ashley's

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method (*C. A.*, 5, 173; 6, 206) dyestuffs must be used which are not changed by Ca or alkalies. Malachite green and chrysoidine are therefore inapplicable.

E. T. WHERRY.

The Petrography of the Salt Deposits of Glückauf, Sondershauser. M. NAUMANN. Univ. Leipzig. *Neues Lahrb. Min. Geol.*, 32 (*Beil. Bd.*), 578–626.—Analyses.

E. T. WHERRY.

Notice of the Ash Fall from Mt. Etna. Correction. E. DITTLER. *Centr. Min.*, 1911, 783.—The isotropic constituent of this ash is probably glass or analcite rather than leucite, although it gave a distinct reaction for K (cf. *C. A.*, 6, 468).

E. T. WHERRY.

Classification of the Schneeberg Ore Deposit, Tyrol. B. GRANIGG AND M. LAZAREVIC. *Z. prakt. Geol.*, 19, 467–9.—Reply. The ores are there shown to be of high temp. metamorphic, rather than vein, origin. In reply, Lazarevic (*C. A.*, 6, 62) reasserts his former conclusions.

E. T. WHERRY.

Starch Grains in Polarized Light (BOUTARIE). 2. Volcanic Origin of Petroleum Gases. 22. Rotating Crystallization Apparatus (WULFF). 1. Oriented Crystal Plates (WULFF). 1. Turkestan Loess (NEUSTRUEV). 15. Tungsten in the Black Hills (QUINNEY). 7.

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9. METALLURGY AND METALLOGRAPHY.

WILLIAM BRADY, WILLIAM T. HALL.

Technical Review of Metal Smelting in 1910. B. NEUMANN. *Z. angew. Chem.*, 25, 193–203; cf. *C. A.*, 6, 589. E. J. C.

Catskill Aqueduct Control Valves. J. OWEN. *Eng. News*, 67, 198–200.—The specifications for the valve materials, which gave good results, are included.

E. J. C.

Progress in Cyano-metallurgy in 1911. R. S. BROWNE. *Mining Eng. World*, 36, 287–9, 348–51. E. J. C.

Poisoning by Cyanide. ANON. *Mining Sci.*, 65, 147.—Measures for the prevention and treatment of cases of poisoning by cyanide are given. E. J. C.

Copper Smelting at the Kennett Plant, California. C. A. TUPPER. *Mining Eng. World*, 36, 337–9. E. J. C.

Phellandrene Process for Extracting Copper in New South Wales. *Chem. Drug.*, July, 29, 1911; through *J. Soc. Chem. Ind.*, 30, 961.—The crushed and ground ore is mixed with water into a cream, and 4 lb. of oil of eucalyptus containing phellandrene is added to each ton of ore; the Cu is collected by the phellandrene and this floats to the top of the magma. The oil is removed by distillation. The oils of eucalyptus containing phellandrene appear to be the only oils suitable for the purpose. An increased production of these oils has resulted. E. J. C.

Titanium; for Malleable Iron. C. H. GALE. Pittsburgh, Pa. *Proc. Am. Foundrymen's Assoc.*, 1911, 271; through *J. Chem. Soc.*, 30, 958.—In view of the well known efficiency of Ti for deoxidizing metals, a Fe–Ti alloy was added to open hearth "malleable." No definit conclusions were arrived at as to the effect of Ti added to the metal in the ladle, but when added to the bath of molten metal in the furnace, about 30–45 min. before tapping, an improvement in the quality of the product, as shown by transverse and tensil tests, was noticed. The Ti was in the proportion of 0.03-0.06% resp. for 2 series of tests. No Ti remained in the finished metal. For

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heavy work, by adding Ti the Si might be lowered and still produce strong soft castings, as it is found that graphite seps. out more readily after purification of the metal by means of Ti. Added in the furnace, Ti prevents oxidation, even though the charge undergoes a prolonged heating. E. J. C.

Producing Light Alloys. ANON. *Mining Eng. World*, 36, 449. E. J. C.

Use of Dorr Thickeners as Accessory to Vacuum Filters. J. L. MENNELL. *Mining Sci.*, 65, 193–4.—A description of a method for sepg. rich solns. from residues in the treatment of clayey slimes which will not wash by means of filtration. E. J. C.

First Aid to Mining Machinery. III. H. M. LANE. *Eng. Min. J.*, 92, 847–51; cf. *C. A.*, 5, 3790.—A description of the methods of making patterns **IV.** *Ibid.*, 894–6.—Description of the methods of making 3-part molds, castings without complete patterns, and the sundry washes, peeling and facing mixts. used by foundrymen to obtain smooth surface castings. **V.** *Ibid.*, 92, 938–40.—The methods of melting and casting brasses, bronzes and bearing metals are discussed. ROBERT KANN.

The Stability of Zinc Sulfate at High Temperatures. V. MOSTOVICH. *Metallurgie*, 8, 763–91.—Pure $ZnSO_4$ heated in a current of dry air remains unchanged until 600°, when it begins to decompose. The decomp. is practically completed at 850°. SiO_2 has no catalyzing effect. This is explained by the decomp. temp. of the sulfate being lower than the temp. at which the silicate is formed. Up to 700° Fe_2O_3 has no effect on the decomp. of $ZnSO_4$ but at higher temps. the reaction is more rapid and is complete at a lower temp. than when Fe_2O_3 is absent. This fact is explained by the formation of Zn ferrites above 700°. In the presence of $CaCO_3$ or CaO, $CaSO_4$ is formed. This reaction takes place but is weaker with lime-bearing minerals than with free lime. With artificial wollastonite only about half of the CaO content was changed to sulfate and with epidote only about $^1/_7$. With pure dry CO at 1100–1130° ZnO was reduced to Zn and volatilized. $ZnSO_4$ was almost all decomposed into ZnO, SO_2 and O. The ZnO is then reduced to Zn and volatilized and the SO_2 is decomposed with the formation of S. A small part of the $ZnSO_4$ is reduced to ZnS. These reactions depend on the temp. and duration of the heating. ZnS is appreciably volatilized at 1100–1130° in a current of CO. The expts. proved that the following reactions take place: $ZnO + CaS + CO = Zn + CaS + CO_2$; $ZnO + CaSO_4 + 5\,CO = Zn + CaS + 5\,CO_2$; $ZnS + CaO + CO = Zn + CaS + CO_2$; $ZnSO_4 + CaO + 5\,CO = Zn + CaS + 5\,CO_2$; $ZnO + BaSO_4 + 5\,CO = Zn + BaS + 5\,CO_2$. CaO is shown to be an energetic desulfurizing agent for ZnS and $ZnSO_4$. It is evident that in the reduction and distillation of roasted blende, $CaSO_4$ and $BaSO_4$ with the sulfides resulting from their reduction are harmless and have no direct effect on the ZnO or the loss of Zn by distillation. No evidence was obtained bearing on the belief that in the reduction by solid C in a neutral atm. the reactions given above are reversible. ZnO when heated in a current of SO_2 was only slightly affected at 300° but was nearly half converted to sulfate at 400° and more than $^3/_4$ converted at 500°. This demonstrates the value of ZnO for the removal of SO_2 from smelter gases. CARLE R. HAYWARD.

Conditions Influencing the Slagging of Copper during Mat Smelting, the Form of the Copper in the Slag and the Lessening of Copper Losses in the Slag. V. VANYUKOV. Tomsk. *Metallurgie*, 9, 1–27, 48–62.—The slag losses in mat smelting, except mechanical losses, depend on the comp. of the slag. Both mat and slag are electrolytes, the conc. of the different ions varying with the relative amounts of the different elements. It is evident that the conc. of cations of a given base in the slag will be affected by the presence of S compds., of this base. The higher the conc. of a given base in the slag the greater is the tendency of the slag to dissolve S compds. of this base and along with it some associated Cu_2S. The degree of this tendency increases

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with the affinity of the element for S and the degree of dissociation of the silicate and S compd. The affinity of Cu, Ni, Co, Fe, Mn, Zn, Ca, Mg, and Al for S is in the order named. Cu losses with slags high in metals at the end of this series are much lower than in slags high in elements at the beginning of the series. CARLE R. HAYWARD.

The Constitution of Tetracalcium Phosphates and their Reducibility by means of Pure Iron and Carbon-bearing Iron. EUGEN STEINWEG. *Metallurgie*, 9, 28–40.—SiO_2 decomposes the $4CaO.P_2O_5$ contained in basic Bessemer slag forming a less basic phosphate that is reduced by C. If Fe is present it takes up the P. Al_2O_3 and Fe_2O_3 have an effect similar to SiO_2. Except when $SiO_2.Al_2O_3$ or Fe_2O_3 is present the $4\ CaO.P_2O_5$ in basic Bessemer slag is not reduced by C-bearing iron. CARLE R. HAYWARD.

Sizing, Diametric and Volumetric, with and without Screens. B. F. RICE. *Met. Chem. Eng.*, 9, 627–8; *Mining Sci.*, 64, 513–4. H. V. MAIN.

Vanadium in Iron and Steel Castings. G. L. MORRIS. *Am. Foundrymen's Assoc.*, 1911, 479–88; *J. Soc. Chem. Ind.*, 30, 1017.—The addition of 0.1% of V to cast Fe is claimed to increase its strength by 10–25% depending on the initial strength of the Fe. This is due to its intensifying effect on the Si and Mn and also to its combination with the C. It appears to produce a more even distribution of the graphite, and in the case of chilled castings a deeper, stronger, and tougher chill. Instances are quoted of its use in the production of locomotive cylinders, piston rings, and cylinder and valve bushings with satisfactory results. The effect of the V on steel castings is stated to increase their elastic limit by 30%, and to give a 50% greater power of withstanding alternating stresses. J. J. M.

Bisulfite Process of Treating Complex Ores. ANON. *Mining World*, 35, 962.—This process deals with complex Pb-Zn ores which cannot be sepd. by the ordinary smelting methods and removes the Zn by converting it into sol. Zn bisulfite. SO_2, obtained from the roasting furnace, is brought in contact with the aq. pulp of the roasted ore and the sol. Zn bisulfite sepd. from the Pb and Ag residues by decantation or filtration. By eliminating part of the SO_2, the Zn comes out as a granular powder, $ZnSO_3$, which on further heating gives ZnO in a condition suitable for distillation in the spelter furnace. Some of the advantages of the process are also mentioned.

H. M. PLUM.

Zincing According to the Schoop Process. M. U. SCHOOP. *Chem. Ztg.*, 35, 1434–6.—The process consists in the "spraying" of the very finely divided metal by means of compressed gases or vapors. The coating is uniform, continuous and of thickness directly proportional to time of spraying, (0.01–10 mm.). Tables are given showing results of tests made on plates with coatings by diff. processes, and the results are discussed in detail. There is apparently little diff. in results between "warm" and "cool" zincing in the Schoop process. The process is not only a mechanical, but an alloy and diffusion one as well, and is at least equal to the "fire" process and superior to the electrolytic. Tests were also made with coatings of Zn + 10% Al, Al, Zn + 10% Zn, Sn, Zn + 10% Pb. It is recommended to zinc and then give a thin coat of Pb to Fe to be used with flue gases and in acid works. Some of the economies claimed are: No loss of Zn by uneven coating or volatilization; temp. of objects coated is not near m. p. of Zn; can be applied to objects of all sizes and shapes in any place.

F. W. SMITHER.

The Present State of the Iron and Steel Industry in Italy. F. S. PUCCI. *Metallurgia italiana*, 3, 507–47.—A review with descriptions and illustrations of the most important plants. F. W. SMITHER.

Amalgamation of Gold in Banket Ore. W. R. DOWLING. *J. Chem. Met. Soc. S. Africa*, 12, 178–82.—Reply to discussion. As to the use of amalgam traps in catch-

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ing Fe worn from the stamps in one case but 0.65% of the Fe was so caught. Magnetic separators have been installed in 2 of the mills. One of them catches 100 lbs. Fe per day. As the Au which escapes amalgamation is encased in, or attached to, fragments of rock, fine crushing is desirable. Difficulties due to black sand are mainly due to the classifier. Recrushing in tube mills is likely to influence this item. Conical classifiers are now taking the place of the spitz-lutten. NaCN dissolves about its own wt. of Au. In any works the relative recoveries by amalgamation and by cyanide are unimportant, provided the combination fulfils the condition of highest recovery at lowest cost. Amalgamation cannot be made all sufficient. Even with an 80% recovery, it will still pay to cyanide the tailings. E. WALLER.

The Effect of Silver, Bismuth and Aluminium on "Tough Pitch" Copper. F. JOHNSON. *Engineering*, 90, 455–8.—By the introduction of small amt. of As and O into pure Cu a sound "tough pitch" ingot was obtained which was capable of being rolled. As does in a large degree compensate for the presence of Bi but with 0.4% As the Bi should not exceed 0.02% and even this is noticeable if the metal is severely treated at red heat. Even 0.01% Bi must be regarded with suspicion because impurities such as Ni not only intensify the effect of Bi but prevent the corrective action of As. Ag up to 0.175% in the presence of As does no serious injury and increases the strength and elasticity. Al sufficient to deoxidize the Cu gives a good metal with lower tensil strength but increased ductility. An excess of Al and Al + As is very harmful to the working properties. E. J. WITZEMANN.

The Polyhedral Structure of Iron-Carbon Alloys. N. J. WARK. *Metallurgie*, 8, 731–6.—Two methods were used: (1) Specimens of the alloys weighing about 1 g. were heated under various salts 100° above the desired temp., then cooled to the latter point and held there for 30 min., then quenched in water at room temp., and etched. (2) The etching was done before quenching by heating the specimen in an atm. of N replacing the N with HCl gas for about 15 sec. The latter was then replaced with N and the specimen chilled by withdrawing the inner tube of the furnace from the jacket. The tests showed that the polyhedral structure exists through the entire series. The second method proved that the structure was not due to changes taking place in the process of cooling. For high C alloys the structure is obtained only by quenching. CARLE R. HAYWARD.

The Binary Systems: Ag_2S-FeS and Mn-As. P. SCHOEN. Freiberger Inst. *Metallurgie*, 8, 737–41.—The Ag_2S-FeS system contains no chem. compds. The curve is the ordinary V type with Ag_2S freezing at 812°, FeS at 1171° and the eutectic (11% Ag_2S) just above 600°. An unexplained evolution of heat takes place at about 175°. The fields of reciprocal solubility in the solid state were not detd. In the Mn-As series 4 constituents were recognized, *viz.*, a soln. of As in Mn, satd. at 5% As, the compd. Mn_2As, the solid soln. of Mn_2As in As, the compd. MnAs (?). There is evidence that a reaction takes place in the solid state forming the magnetic compd. Mn_2As_3, but this was not definitly proved. CARLE R. HAYWARD.

Investigations of the Freezing-point Curves and Structure of some Important Products of Lead Works. G. KOMOROWSKI. *Metallurgie*, 8, 741–2.—22 products from Pb-smelting and refining processes were investigated, the principal results of which, together with photomicrographs, are given. CARLE R. HAYWARD.

The Effect of the Principal Metals and Non-metals on Normal Copper-Tin Bronze. HANNS V. HILLER. *Metallurgie*, 9, 63–71.—The shrinkage of bronze is lessened only by adding considerable (10%) Zn in the presence of tin. Co, Al, Si, Fe, and Ni increase the shrinkage. The tensil strength is raised by Co, Ni and Mn and considerably lowered by Sb or much Zn. Machining is made easier by adding Sb and Pb (up to

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2%) and more difficult by adding Mn and Ni. Adding Zn and Al lessens patina formation, adding Co, Ni, Sb, Fe, Si and P intensifies it. W, Ni, Fe, Mn and Co raise the f. p.

CARLE R. HAYWARD.

Magnetization of Nickel, Cobalt and their Alloys. PIERRE WEISS AND O. BLOCH. *Compt. rend.*, 153, 941–3.—A study of Co-Ni alloys showed that the intensity of magnetization at satn., the Curie const., and the const. N of the mol. field, all vary as linear functions of the % comp.; this was previously found to be the case for reversible ferronickels. Intensity of magnetization at satn. was measured at temps. down to the temp. of liquid air and extrapolated to abs. zero, satn. being obtained for a max. content of 70% Co in a magnetizing field of the order of 10,000 units gauss; the no. of magnetons of the metals appeared as whole nos. within the limits of error.

H. S. PAINE.

Corrosion of Steel Rods in Reinforced Concrete by Sodium Chloride and Calcium Chloride Used in Mixing. C. P. MAYFIELD. *Eng. News*, 67, 258.—Details of tests and conclusions are given. Action is noted. LANGDON PEARSE.

The "Filiations" of Metallic Alloys. LE GRIS. Lab. chim. gen. Sorbonne, Paris. *Rev. métal.*, 8, 613–25.—The filiation of an alloy is the heterogeneous mass obtained by putting together 2 different metals in the melted state when complete mixing has been prevented. When the process has been successful one pure metal is found at the bottom and the other at the top; alloys of all possible percentages lie between. One method of prep. is to melt the more fusible metal in a crucible and introduce an ingot of the other metal, then raise the temp. till fusion or soln. is complete. For Pb-Sn, Pb-Bi, Cd-Sn, Bi-Cd, Sn-Zn, etc., in which the m. ps. lie close together the denser metal is first melted; this is allowed to solidify, the less dense metal placed on top and the whole carefully melted. Jena glass tubes closed at one end with a wad of asbestos are used as crucibles; for high m. metals silica tubes or even elec. light carbons with a 3–4 mm. hole are used. This method is valuable for the study of binary alloys and for elementary instruction. The action of reagents on various zones may be compared, effect of rapid or slow cooling on the size of grains, etc. 20 photomicrographs give results obtained with Pb-Sb, Sn-Sb, Pb-Sn-Sb, Sn-Sb-Cu in addition to the above-mentioned alloys. E. J. WITZEMANN.

The Crystallization of α-Iron. M. ZIEGLER. *Rev. métal.*, 8, 655–72; 22 photomicrographs.—Above the temp. Ar_3 steel is regarded as a solid soln. of C in which impurities such as oxides, silicates, phosphides, sulfides (FeS, MnS) and graphite are present in varying amts. Just as solid particles suspended in salt solns. serve as centers of crystn. so in steel at a "temp. B" a little above the Ar_3 a sepn. of impurities (varying with the C content) takes place. The amt. of impurities sepd. from the Fe and deposited between the crystals depends on the solubility of such impurities in the Fe and the rate of cooling. The rate of cooling will det. whether these impurities will all be deposited between the Fe crystals or will in part penetrate them. The size of Fe crystals will affect the thickness of the layer. The transformation of γ-Fe into α-Fe, when the temp. has reached Ar_3, starts at the points of location of impurities and the sepn. of ferrite (or cementite) continues until the solid residual soln. contains 0.9% C; the latter then seps. as mixed crystals: it is only at the temp. Ar_1 that all of the Fe passes into the α form, which with the cementite enters into the comp. of pearlite. This explains why slag and sulfide pools, which are visible on polished etched specimens, are most frequently found in the ferrite or cementite envelopes surrounding the grains of pearlite in steel. The effect of these phenomena on the mechanical properties of steels is discussed. The increase in size of grain as detd. by the temp. above Ar_3 to which the steel has been heated is attributed to the enlargement of the initial crystals of α-Fe produced by prolonged cooling before reaching Ar_3, the edges

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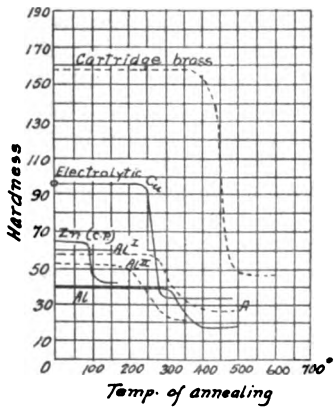
of which, since they contain the impurities persist as α-Fe or ferrite on segregation below Ar_3. E. J. WITZEMANN.

The Use of Carborundum in the Manufacture of Special Steels. L. BARADUC-MULLER. *Rev. métal.*, 8, 673–707; cf. *C. A.*, 5, 860.—At 1400° or a little above, Fe is molten and an agglomerate of the oxide in question and SiC may be added; the Si alloy is formed in the molten steel. The results of this method on a lab. scale are given and were very satisfactory for Si-, Ni-, Cr-Fe alloys. On the basis of these tests industrial expts. were made at Belgian steels works of Ougrée-Marihaye, which are recorded in minute detail. The tests were made on 15-ton lots of steel which was to be: 5% Si or 0.20% Si, 0.25% Cr in the finished product, which in the beginning contained a mean of 0.010% Si: the product to be used for locomotive wheel tires, etc. The oxide-SiC mixture had a somewhat variable comp. depending on the exact results desired but were made in a brick machine and cut in pieces 11 × 2.5 × 1 cm. and dried before being used. They were added either in the Martin furnace or in the ladle. In the latter case they were heated to about 800° in a small reverberatory furnace before being placed in the bottom of the ladle. Since the reaction is exothermic and very rapid the steel is not cooled by the reaction. 300–400 lbs. of "bricks" are required for 15 tons. They do not float on the top of the steel although their d. is only 2.5–2.8. Some typical bricks had the comp.: Cr ore (58.8%) 100 parts, SiC (94.5%) 20.2 parts, cement, 12 parts; Na_2SiO_3, 3.5 parts; another SiC, 23.7, Cr_2O_3 (98%) 61.6, C (94%) 7.3, CaO 1.2, Na_2SiO_3 3 parts, respectively; another SiC 141, Fe_2O_3 (95%) 214, C (94%) 14.8, CaO 8.5, Na_2SiO_3, 6 parts, respectively. It is only the percentage of metal which it is desired to introduce that affects the mode of operation. The process is not economical for high Si steels but where the cost of the SiC is of relative importance only compared with the alloy produced such as Si-Cr, Si-Mn and high Cr-steels, Cr-Ni-steels for projectils, etc., it has proved itself surprizingly economical. Expts. will be made in the elec. furnace using bricks made up of SiC and oxides of W, Mo and V. Further results are promised concerning this process which is now in use at the Ougrée-Marihaye works. E. J. W.



The Annealing of Metals. M. MATWEEFF. *Rev. métal.*, 8, 708–16.—The results are shown in the figure. The hardness produced by hammering leaves Al, Zn, Cu and Ag at a definit temp. The presence of impurities, as in Al^I and Al^{II}, modifies the hardness; the temp. of annealing is lower, and not so sharply defined. E. J. WITZEMANN.

The Aluminium-Zinc Alloys. A. PORTEVIN. *Rev. métal.*, 8, 720–7.—The article gives a report on the mechanical properties of alloys after having been cast in sand: (1) without any subsequent treatment, and (2) alloys containing up to 20% Zn and rich in Al were forged and tested likewise. Forging decreased the ductility 10 to 1 and doubled the tensil strength. If these alloys are to be used for aeroplane castings, etc., it will be well to use alloys not exceeding 20% Zn. E. J. WITZEMANN.

The Tensil Strength of Zinc-Aluminium Alloys. WILLIAM D. BANCROFT. *Rev. métal.*, 8, 734–6.—Because of the ease with which "alzinc" (about 66% Al, 34% Zn) absorbs Si, it cannot be melted in Hessian nor in ordinary graphite crucibles but only in those made from bars of pure artificial graphite. The fusion is made in a gas blast

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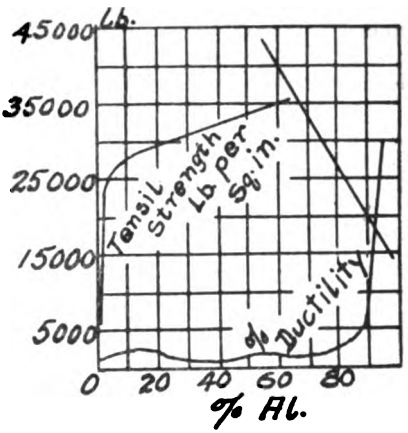
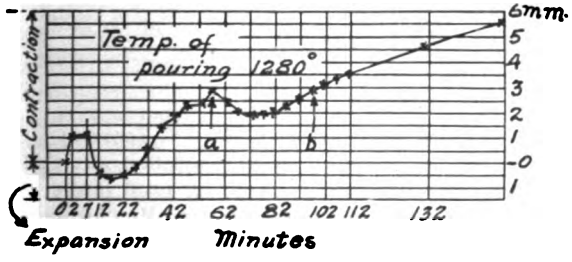
furnace and the metal is stirred with a porcelain tube containing a thermo-elec. couple and cast 50° above its solidification temp. (never above 700° for Al absorbs C at this temp.). When treated in this way the max. mechanical properties indicated in the figure are produced because the crystals formed are very small. E. J. WITZEMANN.



Foundation of a New Theory on the Testing of Cast Iron. A. MESSERSCHMITT. Wiesbaden. *Stahl u. Eisen*, 31, 1785–90.—The figure gives the contraction and expansion of a bar of iron (85 × 60 mm.) in which 2 rods were set 969.6 mm. apart which was cast in a warm, dry sand mold. Measurements were begun as soon as the rods were firm. The iron was a gray cast iron of the comp.: 3.40% total C, 0.45% combined C, 2.00% Si, 0.70% Mn, 0.80% P, 0.10% S. The points to be noted are: A contraction due, no doubt, to the shrinking of the exterior on cooling. From 2–7 mins. the sepn. of graphite becomes marked enough to stop contraction, 7–12 mins. expansion due to graphite formation becomes so great that the bar reaches its max. length which is retained for 10 mins., at 32 mins. the formation of graphite diminishes, at 47 mins. there is a 5-min. pause then further expansion for 5 mins. followed by another period of opposition to contraction by the structure-producing energy which reaches its max. in 20 mins., at *b* equil. arizes and the normal contraction curve sets in. The above curve is simply typical of the iron used under these conditions. Several others are given.



The conclusions in part follow: "Volume change is the process of condensing liquid into solid Fe, caused by cooling. The condensation depends on structure formation, and this is preceded at first by a vol. increase due to the sepn. of C as graphite which remained behind in the formation of the structure. The character and manner of crystallization, and the amt. of ingredients det. the differences in structure." Structure formation is therefore a struggle between the constituents of the Fe, and their chem. compds. with which the physical processes act and react. These chem. processes can easily be observed graphically by a study of the "contraction struggle." It is suggested that such studies may become of com. use in the study of iron.

E. J. WITZEMANN.

Uses of Blast Furnace Gas (BUCK). 21. Gold Extraction (MINNICH). 8. Metallic Roofing (AUPPERLE). 20. Metallic Containers for Edible Fats and Oils (EMERY). 12. Vanadium Poisoning (LEES). 11H. Cement from Furnace Slag (KÜHL). 20.

U. S., 1,017,473, Feb. 13. A. P. SCOTT. **Producing nearly pure iron.**

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U. S., 1,017,620, Feb. 13. R. D. CAMPBELL. **Denitrogenizing practically pure iron.**

U. S., 1,017,629, Feb. 13. W. S. ROCKEY and H. ELDRIDGE. **Making and refining copper alloys.**

U. S., 1,017,748, Feb. 20. M. GRÄF and O. PESCHEL. **Case-hardening metals.**

U. S., 1,017,807, Feb. 20. A. J. ROSSI. **Making steel containing titanium, manganese and very little silicon..**

U. S., 1,017,903–4–5–6–7–8, Feb. 20. W. S. POTTER. **Working manganese steel.**

U. S., 1,017,914, Feb. 20. H. A. RICHARDSON. **Cement-steel plates.**

U. S., 1,017,969, Feb. 20. R. T. HARRIS. **Method of casting metal.**

U. S., 1,018,000–1–2, Feb. 20. W. S. POTTER. **Working manganese steel.**

U. S., 1,018,361–2–3–4–5–6–7–8–9–70, Feb. 20. *Idem.* **Working manganese steel and other steels.**

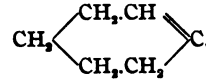
Ger., 230,579, Aug. 13, 1908. J. P. BODINET. **Crucible blast furnace with air blast from below or from the side.** Between the grate and the lower end of the furnace lining is an opening disposed with regard to the height of cold blown slags with use of blast from bottom only. This opening admits lateral air blast and permits of lateral raking, the opening being limited by Fe with air-slots, the outside jacket of the furnace having raking openings with doors.

Ger., 231,500, Apr. 20, 1910. R. DIETRICH. **Puddling furnace with several hearths, especially for steel production.**

10. ORGANIC CHEMISTRY.

J. BISHOP TINGLE.

Isomerization of the Cyclic Unsaturated Hydrocarbons C_8H_{12}. V. EGOROVA. St. Petersburg. *J. Russ. Phys. Chem. Soc.*, 43, 1116–24.—Cyclohexylethyl alc. C_6H_{11}-C_2H_4OH (I) was made by converting cyclohexylcarbinol (*Ibid.*, 39, 1218) into cyclohexylmethyl bromide and treating the latter with trioxymethylene and Mg (Sokovnin's method, by private communic.). By treating (I) with HI *cyclohexylethyl iodide* C_6H_{11}-C_2H_4I (II) was prepared; yield, 86%; b_{18} 101.5–3°; d_0^0 1.4807; d_0^{20} 1.4578. By Pogorzhelskii's method (*Ibid.*, 35, 179) (II) yielded cyclohexylethyl ether (b. 193–5°; b_{14} 76–8°) and cyclohexylethylene $C_6H_{11}CH : CH_2$ (III). The latter can also be made by the action of chloral (but not by that of Ph_2CO) on (II) by Iotzitz' method (*Ibid.*, 40, 545). By converting (III) into the dibromide $C_6H_{11}CHBrCH_2Br$ (b_{18} 130–2°) and treating the latter with KOH in alc. Cyclohexylacetylene $C_6H_{11}CCH$ (IV) was obtained (cf. Darzens and Rost, *C. A.*, 4, 583); d_0^0 0.8602; d_0^{20} 0.8424; n_D 1.4597. By heating (IV) to 140° (sharp) for 10 hrs. it isomerizes to *cyclohexeneethylene* $C_8H_{10} : C : CH_2$; b. 138–41°; d_0^0 0.8682; d_0^{20} 0.8508; n_D 1.4826. By warming with Na to 100° (V) changes partly to (IV) and partly to an ethylene hydrocarbon C_8H_{14} (III ?). By heating (V) with BzOH (Borgman, *Ibid.*, 39, 1218) it isomerizes to *vinylcyclohexene*



(VI); b. 143–5°; d_0^0 0.8862; d_0^{20} 0.8701; n_D 1.4906; is not affected by heating with Na. Though (VI) contains conjugated double unions, it does not show any optical exaltation (cf. Auwers, *C. A.*, 4, 1744). H. M. GORDIN.

Decomposition of Alkylidene Hydrazines. Transformation of Pulegone into the Bicyclic Hydrocarbon $C_{10}H_{18}$. N. KIZHNER AND A. ZAVADOVSKII. *J. Russ. Phys.*

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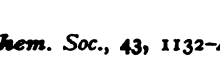
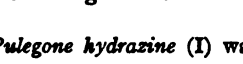
Chem. Soc., 43, 1132–48.—*Pulegone hydrazine* (I) was obtained by treating pulegone



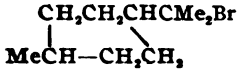
(I)



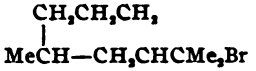
(II)

(III)

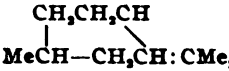
with $N_2H_4.H_2O$. Since mineral acids do not hydrolyze it and upon decomp. it does not yield $\Delta^{4(8)}$-menthene (Wallach, *C. A.*, 2, 2083), it cannot have the normal formula (I), but must have the formula (II). It is a colorless liquid of the odor of cyclic hydrazines, b_{22} 131–2°; b_{24} 143–4°; d_0^{20} 0.9602; n_D 1.4943; is oxidized by the air, reduces NH_3 solns. of Ag_2O and forms salts with acids. It gives a *phenylthiourea derivative*, PhNH.CS.NH.$C_{10}H_{16}$, m. 176°; $[\alpha]_D$ = —114–4.6° (in C_6H_6). By blowing air into a soln. of (II) it is reconverted into pulegone. Hot mineral acids change (II) to the bicyclic carane (III). HBr changes (III) to a mixture of 2 bromides (IV) and (V). When



(IV)



(V)

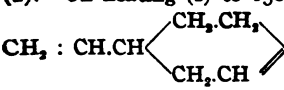


(VI)

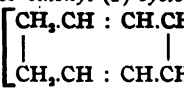
this mixture is boiled with KOH in alc. *m*-$\Delta^{3(8)}$-menthene (VI) is produced (cf. Wallach, *C. A.*, 2, 2083) which upon oxidation gives AcMe, β-methyladipic acid and 1,3-methylcyclohexanone, while when boiled with $PhNH_2$ (α) yields *m*-$\Delta^{8(9)}$-menthene (VII) (b_{761} 171–2°; d_0^{20} 0.8194; $[\alpha]_D$ 3.99°) containing some of (VI). Fuming HI changes (VII) to an iodide which is converted by KOH in aq. alc. into (VI). On changing (III) to an iodide and boiling the latter with HI it is reduced to *m*-menthane. The same *m*-menthane was also obtained by reducing (VII). Br changes (III) to a bromide (α = 22.58° in 10 cm. tube) which by b. with quinoline changes to *m*-$\Delta^{2,8(9)}$-menthadiĕne (cf. *C. A.*, 5, 2066) which on prolonged b. with Na becomes optically inactive.

H. M. Gordin.

Polymerization of Diethylene Hydrocarbons. Polymerization of Divinyl. S. V. Lebedev and N. A. Skavronskaya. Lab. Univ., St. Petersburg. *J. Russ. Phys. Chem. Soc.*, 43, 1124–31.—Filippov's method yields at most 2% divinyl (I). On heating (I) to 150° for 10 days it polymerizes to *ethenyl-(1)-cyclohexene-(3)*

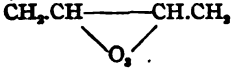


(II) and a *polymer*



(III).

Part of (III) is sol. in (II) and in CCl_4, another part is insol. Whether the 2 parts are identical in formula was not detd. (II) is a colorless liquid of a sharp mustard-like odor; oxidizable in the air; gives a yellow coloration with $C(NO_2)_4$; b. 129.5–30.5°; b_{100} 65–6°; d_4^0 0.8484; d_4^{20} 0.832; $n_D^{20.1}$ 1.46529. Satd. with H in presence of Pt black (II) changes to ethylcyclohexane. Br changes (II) to the corresponding *tetrabromide* $C_8H_{12}Br_4$; m. 69.5–70°. Oxidation with O_3 changes (II) to an indefinit mixt. of acids. $KMnO_4$ in aq. AcMe oxidizes (II) to β-carboxyadipic acid $CO_2H.CH_2.CH(CO_2H).(CH_2)_2.CO_2H$ (m. 116–8°). On treating the sol. part of (III) with O_3 in CCl_4 an *ozonide*



was obtained; colorless powder, explodes when heated, becomes elec. by friction, insol. in usual solvents; decomp. with H_2O yields succinic acid and succinic dialdehyde.

H. M. Gordin.

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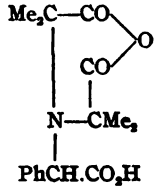
Reaction of α-Hydroxyisobutyronitrile with the Nitrile of Ethyl *S,S*-Diphenyliminodiacetate. G. L. STADNIKOV. Org. Lab., Univ. Moscow. *J. Russ. Phys. Chem. Soc.*, 43, 1235–44.—Nef explains the reaction between hydroxynitriles and esters of iminonitriles by assuming a dissociation of the hydroxynitrile into H_2O and an "alkylidene", the H_2O adding itself first to the ester of the iminonitrile which then combines with the alkylidene, while according to S. the hydroxynitrile adds itself directly to the ester of the imino acid forming an NH_4 compd. In order to prove this, S. chose α-hydroxybutyronitrile, a hydroxynitrile which, not containing a CHOH, could not give H_2O as a dissociation product. This was made to react with the nitrile of Et *S,S*-diphenyliminodiacetate (*a*) and the reaction product was undoubtedly the *anhydride* (I) of the expected, but not isolated, tetramethylphenylnitrilotriacetic acid. The last compd. is hydrolyzed to the corresponding acid which then changes to the anhydride



(I).

The anhydride (I) was made by digesting for a week in an autoclave, in the light, at ordinary temp., a mixture of the HCl salt of (*a*), Me_2CO, KCN and HCl, and hydrolyzing the product by b. with 20% HCl; silky needles, decomp. 180–1° in sealed capillary. H. M. GORDIN.

Formation of Levulic Acid from Glucosamine, Chitin and Chitose. HEDWIG HAMBURGER. Berlin. *Biochem. Z.*, 36, 1–4.—That levulic acid is formed as a product of the action of HCl on other substances than the simple hexoses was shown by subjecting glucosamine and chitin to more energetic treatment with mineral acids. As a result levulic acid was obtained from these sources. F. B. LA FORGE.

Artificial Preparation of Carbohydrate-phosphoric Esters and Glycerophosphoric Acid. C. NEUBERG AND E. KRETSCHMER. Berlin. *Biochem. Z.*, 36, 5–14; cf. *C. A.*, 4, 3072.—By treatment of *d*-galactose and glycerol with $POCl_3$ in the presence of $CaCO_3$, *calcium d-galactophosphate* and *calcium glycerophosphate* were obtained. The product from fructose was only obtained pure from phosphosaccharin by hydrolysis with mineral acids, whereby only the sugar cleavage takes place. F. B. LA FORGE.

Chemistry of the Amyl Series. A. MICHAEL AND F. ZEIDLER. *Ann.*, 385, 227–92.—Isopropylethylene is unchanged by dil. HCl or HBr. It gives a polymer with 2 vols. H_2SO_4 + 1 vol. H_2O and with conc. H_2SO_4 a sulfonic acid and decomp. products. Trimethylethylene is dissolved by 2 *N* HCl in 18 hrs. by shaking, by 2 *N* HBr in 17 hrs., by 10 pts. 5 *N* HCl in 5 hrs., and in 2 hrs. by 4.5 *N* HBr. The rapidity of soln. is similar to that of the unsym. methylethylethylene. Isopropylethylene is sepd. from trimethyethylene by shaking with 4.5 *N* HBr. The amylene obtained by the action of P_4O_{10} on isoamyl ethyl ether contained 10% isopropylethylene. Tert. amyl alc. heated with 4.5 *N* HBr in sealed tube at 100° gives a nearly quant. yield of trimethylethylene. Reaction complete in 5 min. Secondary isoamyl alc. gives the amylene after heating 24 hrs. with HI or after 1 hr. with 4.5 *N* HBr. Tertiary and secondary isoamyl alc. are detd. almost quant. in presence of each other by heating 5 min. with 3 *N* HBr, sepg. the trimethylethylene and reheating the under layer 1.5 hrs. with 4.5 *N* HBr at 100°. Isopropylethylene is not attacked by gaseous HBr at 0°. Aq. HBr gives about 48% of the tertiary and 52% of the sec. bromide and not merely the secondary as stated by Vishnegradskii and Ipat'ev. AcOH soln. of

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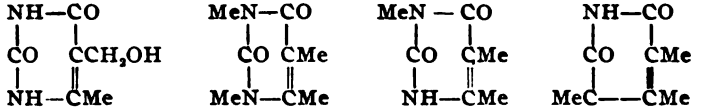
HBr gives 6.10% tertiary, 28.62% secondary and 65.28% primary bromide. HI, gaseous, aq., and in AcOH, gives a mixt. of iodides, b. 127–38°, mostly the tertiary except in the last case. Trimethylethylene gives with aq. HCl 100% tert. chloride and the same in AcOH soln. Aq. HBr gives a like product and in AcOH a product containing 86% tert. and 14% sec. bromide. HI, aq., and in AcOH, gives only the tert. iodide. The unsymmetrical methylethylethylene gives with aq. HBr a product containing 97.73% tert. and 2.27% primary bromide. The tert. iodide, b. 147°, is obtained fron isoamyl alc. by means of red P and I, or by HI, or from isoamyl ethyl ether by HI at 100° in sealed tube. Isoamyl alc. with HBr gives 4% of the tert. bromide only. Isoamyl ethyl ether, satd. with HBr at 0° and then heated 3 hrs. at 100°, gives the *i* primary isoamyl bromide, b_{730} 119–9.2°. The ether is not hydrolyzed by 5 or 10% H_2SO_4 but the alc. is obtained (1) by b. 90 hrs. the bromide with H_2O + PbO_2 or (2) with Ag acetate at 150° and subsequent hydrolysis. Yield in (2) 76.7% of the theory. Active isoamyl alc. with HI at 100° gives 86.7% yield of the iodide. Bromide, 77.7% yield. 7% of tert. bromide present. Isopropylmethylcarbinol with HI gives 81.16% tert. iodide. HBr gives 78.64% tertiary + 21.19% sec. bromide. Tert. amyl alc. gives the tert. iodide only. Bromide likewise. The primary isoamyl bromide from fused oil when heated 3 hrs. on aniline vapor gives small amts. tert. and sec. bromides. The inactive bromide remains unchanged in $PhNH_2$ or $PhNO_2$ vapor but in isobutyl benzoate vapor a partial rearrangement takes place. Active isoamyl bromide at 208° in 10 min. gives 5.49% tert. and in 7 hrs. 23.12% sec. and tert. bromide. The sec. isoamyl bromide gives at 100° no change, at 110° 2.46% tert. bromide, at 175° 5.22%, at 184° in 1 hr. 13.43%, in 10 hrs. 32.87%, at 208° in 1 hr. 37.85%, in 15 hrs. 69.50% and at 237° in 1 hr. 63.72%, in 3 hrs. 65.70% tert. bromide. Tert. amyl bromide at 175° gives in 0.5 hr. 98.43% tert. bromide at 184° in 3 hrs. 96.71% and at 208° in 1 hr. 72.10%, in 3 hrs. 68.56% tert. bromide with slight decomp. ALVIN S. WHEELER.

Condensation of Methyluracil with Formaldehyde. W. KIRCHER. Hanover. *Ann.*, **385**, 293–314.—*Hydroxymethylmethyluracil* (I) is prepared by dissolving 10 g.



(I) (II) (III) (IV)

methyluracil in 20 g. 40% HCHO and 65 cc. H_2O + 6 drops conc. HCl. Plates or needles from H_2O. Yield, 76.4% of the theoretical. Or 5 g. methyluracil is dissolved in just the required amt. 5% NaOH and 9.2 g. HCHO. Yield, 89.5%. Needles, decomp., 305–10°. Methyluracil is regenerated after b. in H_2O 5–6 hrs. If b. in dil. HCl, a difficultly sol. microcryst. *compound*, $C_{12}H_{14}O_5N_4$, is pptd. Decomp., 303–7°. 4,5-Dimethyluracil, from hydroxymethylmethyluracil by reduction with Sn + HCl. Prismatic leaves, m. 294–6°. Wheeler gives 292°. Yield, 38.41%. *Sodium salt*, silky needles. A by-product of the reduction is the *compound*, $C_{11}H_{12}O_4N_4$, microscopic crystals, insol. in H_2O, decomp., 302–7°. Oxidation of dimethyluracil with $KMnO_4$ gave acetylurea and oxalic acid. It is methylated in alc., with KOH and MeI, giving tetramethyluracil 13.3%, 1,4,5-trimethyluracil 26.5%, 3,4,5-trimethyluracil 21.9% and an inseparable mixture. *1,3,4,5-Tetramethyluracil* (II), fine prisms from abs. alc., m. 123–5.5°. *1,4,5-Trimethyluracil* (III), prismatic needles from H_2O, m. 220.5–22°. *3,4,5-Trimethyluracil* (IV), prismatic needles from alc., m. 172–4°. 4,5-Dimethyluracil is also synthesized from α-methyl-β-aminocrotonic ester by the action of HOCN. Yield, 69.6%. The uracil, suspended in H_2O, gives with Br *4,5-dimethyl-5-hydroxy-4-bromodihydrouracil* (V), rhombic crystals from H_2O, m. 226–7° (decomp.). B. with

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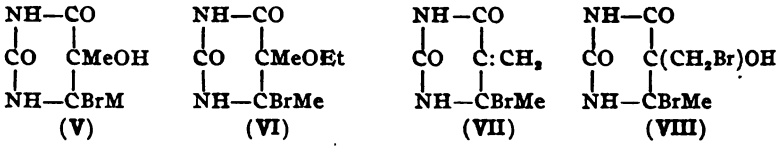
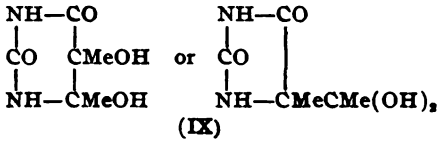
alc., gives *4,5-dimethyl-5-ethoxy-4-bromodihydrouracil* (VI), fine needles, m. 225–6° (decomp.). If (V) is heated at 105°, H_2O is split off, giving *5-methylene-4-methyl-*



(V) (VI) (VII) (VIII)

4-bromodihydrouracil (VII), which with Br yields *4-methyl-5-hydroxy-4-bromo-5-bromomethyldihydrouracil* (VIII), rhombic crystals, m. 165–7° (decomp.). Also prepared from dimethyluracil by the direct action of Br. Treatment of (V) with KOH gives *4,5-dimethyl-4,5-dihydroxydihydrouracil* (IX), crystals from H_2O, loses H_2O of crystn.



(IX)

at 96–8° and m. 168.5–9°. ALVIN S. WHEELER.

Alkyl Derivatives of Methyluracil. O. BÜCKENDORFF. Hanover. *Ann.*, 385, 314–27.—Methyluracil was ethylated according to the method of Hoebel (*Ann.*, 353, 242), giving (from 84 g.) 5.3 g. α-, 5.4 g. β-ethylmethyluracil, 1.3 g. oily diethyluracil and 40 g. unchanged methyluracil. α-Ethylmethyluracil, suspended in H_2O and treated with Br, gives *4-methyl-4-hydroxy-3-ethyl-5-dibromodihydrouracil*, $C_7H_{10}O_3N_2Br_2$, cryst. powder, m. about 160° and decomp. 170°. If b. with alc., it gives *4-methyl-3-ethyl-5-bromouracil*, $C_7H_9O_2N_2Br$, colorless crystals, m. 234–6°. This gives, when b. 4 hrs. at 150–60° with 25% NH_4OH, *4-methyl-5-amino-3-ethyluracil*, $C_7H_{11}O_2N_3$, brownish crystals from alc., m. 234-6°. α-Ethylmethyluracil gives with conc. H_2SO_4 + HNO_3 (1.4), the 3-ethyl-5-nitrouracil of Lehmann. Colorless needles from alc., m. 194–5°. *4-Methyl-4-hydroxy-1-ethyl-5-dibromodihydrouracil*, $C_7H_{10}N_2O_3Br_2$, from β-ethylmethyluracil, yellow, cryst. powder, m. about 160° and decomp., 170°. *4-Methyl-1-ethyl-5-bromouracil*, pale yellow needles, m. 203–6°. *4-Methyl-5-amino-1-ethyluracil*, bright, yellow crystals, m. 203–5°. *1-Ethyl-5-nitrouracil-4-carboxylic acid* is obtained by the action of conc. H_2SO_4 + fuming HNO_3 (conc. HNO_3 satd. with N oxides and dil. with one-third vol. H_2O) on β-ethylmethyluracil. Crystals from H_2O, m. 189° with decomp. *Compound*, $C_7H_6N_4O_6$, a very difficultly sol. by-product. Fine, yellow needles, decomp. 180–220°. The carboxylic acid heated at 140–50° gives *1-ethyl-5-nitrouracil*, golden yellow crystals, from H_2O, m. 159–61°. *1-Ethyl-5-aminouracil*, pale yellow crystals from alc., m. 171–2°. Propylation of methyluracil gave a mixt. of *4-methyl-3-propyluracil*, m. 170–2° and *4-methyl-1-propyluracil*, m. 184°. Methylation and ethylation of these propyl compds. gave the following alkyl derivatives. *4-Methyl-3-ethyl-1-propyluracil*, from 4-methyl-3-ethyluracil or 4-methyl-1-propyluracil, colorless crystals from Et_2O, m. 63–5°. *4-Methyl-1-ethyl-4-propyluracil*, crystals from ligroin, m. 38–40°. *1,4-Dimethyl-3-propyluracil*, from 1,4-dimethyluracil or 4-methyl-3-propyluracil, crystals from Et_2O + ligroin, m. 52–4°. *3,4-Dimethyl-1-propyluracil*, from 3,4-dimethyluracil or 4-methyl-1-propyluracil, crystals from H_2O, m. 85–7°. *5-Methyl-1-allyluracil*, m. 168–9° and 4-methyl-4-allyluracil, m. 180–2°, were obtained from methyluracil. *1,4-Dimethyl-3-allyluracil*, from 1,4-dimethyluracil or 4-methyl-3-allyluracil, crystals from Et_2O, m. 45–7°. *3,4-Dimethyl-1-allyluracil*, crystals from Et_2O, m. 59–61°. Methyluracil was b. with isobutyl iodide and KOH 55 hrs. but the reaction was far from complete. α-Isobutylmethyluracil, crystals from alc., m. 195–6°. β isomer, from H_2O, m. 133–5°. ALVIN S. WHEELER.

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2-Iodo-5-ethyl-1-methylbenzene and Derivatives with Higher Valence. C. WILLGERODT AND M. JAHN. Univ. Freiburg. *Ann.*, 385, 428–40.—*2-Iodo-5-ethyl-1-methylbenzene* was prepared by converting *o*-toluidine into *o*-amino-*m*(5)-ethyltoluene after the method of Benz and diazotization of this. Pale yellow oil, b. 242°. *1-Methyl-5-ethyl-2-phenyliodide chloride*, $C_9H_{11}Cl_2I$, yellow needles in rosets from AcOH. *2-Iodoso-1-methyl-5-ethylbenzenes*, $C_9H_{11}OI$, white powder, decomp., 162°. *Acetate*, white microcryst. powder, m. 104°. *2-Iodo-1-methyl-5-ethylbenzene*, $C_9H_{11}O_2I$, is formed by distilling the iodoso compd. in steam. Needle-like crystals which explode violently about 161°. *Di-1-methyl-5-ethylphenyl-2-iodinium hydroxide*, $C_{18}H_{22}OI$, no obtainable in free condition since it decomp. when its soln. is conc. in desiccator. *Di-1-methyl-5-ethylphenyl-2-iodinium chloride*, $C_{18}H_{22}ClI$, by treatment of the soln. of the above base with HCl. Thick, transparent rhombic prisms, m. 148°. *Chloroplatinate*, reddish yellow needles, m. 163°. *Chloromercurate*, small, white needles, m. 109–10°. Hydrobromide, needles, m. 162°. Hydroiodide, cryst. powder, m. 134°. *Nitrate*, rhombic crystals, m. about 150° (decomp.). *Dichromate*, microcryst., decomp., about 132°. *Monoiodo-di-1-methyl-5-ethylphenyl-2-iodinium hydroxide* could not be isolated, *Hydrochloride*, yellowish, m. about 88°. *Chloroplatinate*, amorphous ppt., m. 110–1° (decomp.). *Chloromercurate*, yellowish white ppt., m. about 87°. *Hydrobromide*, orange microcryst. ppt., m. about 101°. *Hydriodide*, yellow amorphous ppt., m. about 82°. *Bichromate*, orange ppt., m. 52°. *o-Tolyl-1-methyl-5-ethylphenyl-2-iodinium hydroxide*, employed only in soln. *Hydrochloride*, needles or rhombic columns, m. 174°. *Chloroplatinate*, gold-like leaves from alc., decomp. 174°. *Chloromercurate*, needles from alc., m. 133°. *Hydrobromide*, small needles from H_2O, m. 167°. *Hydriodide*, microcryst. powder, decomp., 135°. *Dichromate*, needles from alc., explodes at 138°. *Dichlorovinyl-1-methyl-5-ethylphenyl-2-iodinium chloride*, $C_{11}H_{12}Cl_2I$, white rhombic crystals, m. 144°. *Chloroplatinate*, dark yellow ppt. *Chloromercurate*, needles, m. 67°. *Hydrobromide*, cryst. ppt., m. 126°. *Hydriodide*, microcryst. powder, decomp., 71°. *Nitrate*, needles, m. 93–4°. *Acid sulfate*, needles, m. 56°. *Dichromate*, orange ppt.

ALVIN S. WHEELER.

***s*-Iodopseudocumene and Derivatives.** C. WILLGERODT AND R. MEYER. Univ. Freiburg. *Ann.*, 385, 341–51.—*s-Iodopseudocumene*, prepared by dissolving 11 g. pseudocumene in 100 cc. petroleum ether and b. with 20 g. sulfur iodide in 100 cc. HNO_3 (1.34) 4 hrs. on the water bath. M. 37°. *s-Pseudocumyliodide chloride*, $C_9H_{11}Cl_2I$, yellow crystals, decomp., 66°. *s-Iodosopseudocumene*, $C_9H_{11}OI$, yellowish white powder, decomp., 171°. *Acetate*, needles, m. 123°. *s-Iodopseudocumene*, $C_9H_{11}O_2I$, jelly-like, explodes about 210°. *Di-s-pseudocumyliodinium compounds. Hydroxide*, could not be obtained pure. *Hydrochloride*, cryst. powder, m. 107°. *Chloroplatinate*, cryst. powder, m. 159°. *Chloroaurate*, needles from alc., m. 90°. *Hydrobromide* needles from alc., m. 118°. *Hydriodide*, m. 120°. *Dichromate*, amorphous ppt., explodes at 120°. Monoiodo-di-*s*-pseudocumyliodinium compds. Anion = $C_9H(C_9H_{10}I)I$. *Hydrochloride*, m. 106°. *Chloroplatinate*, m. 150°. *Chloromercurate*, amorphous, m. 108°. *Chloroaurate*, amorphous, *Hydrobromide*, bright yellow amorphous mass, m. 105°. *Hydriodide*, amorphous powder, m. 112°. *Dichromate*, decomp. 113°. Phenyl-*s*-pseudocumyliodinium compds. Anion = $PhC_9H_{11}I$. *Hydrochloride*, cryst. powder, m. 186°. *Chloroplatinate*, amorphous, m. 188°. *Chloroaurate*, cryst. ppt., m. 117°. *Chloromercurate*, needles from alc., m. 161°. *Hydrobromide*, needles from H_2O, m. 173°. *Hydriodide*, cryst., decomp. 147°. *Dichromate*, cryst. powder, explodes at 184°. *p*-Tolyl-*s*-pseudocumyliodinium compds. Anion = $C_7H_7(C_9H_{11})I$. *Hydrochloride*, needles from H_2O, m. 171°. *Chloroplatinate*, leaves from alc., decomp. about 165°. *Chloroaurate*, needles, m. 71°. *Chloromercurate*, needles, m. 81°. *Hydrobromide*, cryst. powder, m. 148°. *Hydriodide*, decomp. 108°. *Dichromate*, needles,

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decomp. 149°. Dichlorobinyl-*s*-pseudocumyliodinium compds. Anion = CHCl = $CCl(C_6H_{11})I$. *Hydrochloride*, m. 169°. *Chloroplatinate*, cryst. powder, decomp. 150°. *Chloroaurate*, cryst., m. about 134°. *Hydrobromide*, amorphous, m. 131°. *Hydriodide*, amorphous, m. 96°. *p-Dichloro-s-iodopseudocumene*, $C_9H_9Cl_2I$, beautiful crystals from C_6H_6, m. 188–9°. Attempts to prepare the iodide chloride failed.

ALVIN S. WHEELER.

Calcium Ethylates. DE FORCRAND. *Compt. rend.*, 153, 1441–4.—The compd. $Ca(OEt)_2.2EtOH$, obtained from EtOH and Ca or its hydride, acetylide or amide, when kept over H_2SO_4, slowly changes in comp., passing through the stages $Ca(OEt)_2.H_2O.EtOH$, $2Ca(OEt)_2.CaO.2H_2O$, $Ca(OEt)_2.CaO.H_2O$, $Ca(OEt)_2.3CaO.5H_2O$, etc. The reaction is explained as being due to the catalytic action of CaO (which is always present in the Ca compd. used in making the ethylate) on the EtOH and the ethylate; the latter decomp. into Et_2O and CaO, as has been found by Senderens and by Sabatier and Mailhe. C. A. R.

Hypochlorous Amides. E. BOISMENU. *Compt. rend.*, 153, 1482–4; cf. *C. A.*, 6, 82, 619.—Aq. HOCl and the calc. amt. of $AcNH_2$ give *acetyl chloroamide*, m. 110°; its H_2O soln. gives no ppt. in the cold with $AgNO_3$ but in hot soln. a ppt. is at once formed and a strong odor of MeCN is perceived; it decolorizes indigo in HCl soln. and liberates 2 ats. I from KI. If only 0.5 as much $AcNH_2$ is used and the soln. is kept at 0° or below, a pale yellow liquid, insol. in H_2O and having the comp. of *acetyl dichloroamide*, is obtained; it is very unstable and is completely transformed into the AcNHCl by a little H_2O. *Propionyl dichloroamide. Formyl dichloroamide*, very unstable, reddish yellow liquid. C. A. R.

Three Normal Saturated Hydrocarbons: Triacontane, Tetratriacontane and Hexatriacontane. A. GASCARD. *Compt. rend.*, 153, 1484–7.—*Triacontane*, $C_{30}H_{62}$, scales, m. 65.2–5.5°, is obtained by b. *pentadecyl iodide*, scales, m. 24.5°, solidify 23.5°, in xylene with Na for about 10 hrs. *Tetratriacontane*, $C_{34}H_{70}$, scales, m. 73.2°, is obtained by heating Ag stearate with I, saponifying the *heptadecyl stearate*, silky lamellas, m. 64.7°, treating the *heptadecyl alcohol*, pearly scales, m. 54°, with PI_3, and b. the *heptadecyl iodide*, lamellas, m. 33.6°, in xylene with Na. *Octadecyl alcohol*, from Et stearate and Na in abs. alc., m. 58.5°; *iodide*, m. 33.5°; the latter gives *hexatriacontane*, $C_{36}H_{74}$, lamellas, m. 76°. CHAS. A. ROUILLER.

Action of Potassium Hydroxide on Primary Alcohols; Preparation of the Corresponding Acids. MARCEL GUERBET. *Compt. rend.*, 153, 1487–9.—Various alcs. (Et, Pr, isoamyl, methylpropylethyl, heptyl, isopropylisoamylethyl, dienanthyl, benzyl, methylbenzylethyl and isopropylbenzylethyl) were heated in sealed tubes at 240–50° for 16 hrs. with 3 mols. dehydrated KOH. All are transformed into the corresponding acids and H; those having less than 7 C ats. are also partly dehydrated into the corresponding ethylene compds. The acids were identified by their amides. *Methylpropylacetamide*, m. 85°. *β-Heptylheptamide*, $Me(CH_2)_5CH(C_7H_{15})CH_2CONH_2$, m. 107–8°. CHAS. A. ROUILLER.

Complex Compounds of Platinum Bromide and Organic Sulfides. Z. CHUGAEV AND D. FRAENKEL. *Compt. rend.*, 154, 33–5; cf. *C. A.*, 4, 2470.—K_2PtBr_4 and $(CH_2SEt)_2$ in HBr give the *compound* $[Pt(EtSCH_2CH_2SEt)_2]PtBr_4$, gray, microcryst. substance, m. 157°, insol. in the ordinary solvents and passing over, when heated at 100°, into an isomeric, light yellow *substance* of the same m. p., somewhat sol. in $CHCl_3$ and hot H_2O, and having the structure $Pt(EtSCH_2CH_2SEt)Br_2$. When treated with 1 mol. K_2PtBr_4, the yellow compd. gives the gray produet. Similarly, from Me_2S is obtained a *compound* $[Pt(Me_2S)_4]PtBr_4$, gray, insol. substance passing over, even at room temp., into the yellow isomer already obtained by Blomstrand. The

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stability of complexes of the type of Magnus' salt decreases in passing from disulfide to monosulfide and from chloroplatinous to bromoplatinous acid derivs., so that H_2PtI_4 does not form the corresponding compds. C. A. R.

Decomposition of Azines by Heat. Paul Pascal and Léon Normand. Fac. sci., Lille. *Bull. soc. chim.*, 9, 1029–37, 1059–68; 11, 21–5.—When azines, RCH : N_2:CHR′, are heated above their m. p., at temp. varying with the nature of the azine, they lose N and form the stilbene deriv., RCH : CHR′, and at the same time H, chiefly as NH_3, giving, when the *o*-positions are not occupied, phenanthrene derivs. By plotting the vols. of N evolved and the average velocity of evolution of NH_3 against the temp., 2 curves are obtained which intersect the axis of temp. at the same point, *viz.*, the decomp. point—a much more accurate method than that of simply detg. the temp. at which decomp. becomes visible. In this way it was shown that PhCH:N_2 : CHPh (cf. Curtius and Jay, *J. prakt. Chem.*, 39, 44) begins to decomp. 275°; the addition of 20% of a powdered metal (bronze, Mg or Al) does not increase the amt. of gas evolved (*i. e.*, the amt. of PhCH : CHPh formed) but the speed with which equil. is attained is greatly increased. On distilling the product of decomp., PhCH:CHPh and unchanged azine pass over at 300–25°; at 325–45°, a yellowish green liquid which solidifies on cooling and gives, from alc., a mixt. of phenanthrene and a *compound*, apparently $C_{33}H_{22}N_2$, long needles from $PhNO_2$, m. 261°, b. 460°; *picrate*, golden yellow, m. 198°. It is possibly identical with the compd. obtained by Curtius by the decomp. of HOCHPhCPh : NNH_2. *p*-Tolualazine begins to decomp. 314°; the unsatd. compd. MeC_6H_4CH : CHC_6H_4Me, is still the main product, although it is obtained in smaller amt. than in the preceding case and the NH_3 is evolved at a markedly greater rate. *Cuminalazine*, yellow leaflets, m. 113.6°, begins to decomp. 281°, giving a good yield of *di-p-isopropylstilbene*, scales, m. 129°; *dibromide*, scales, m. 186–7°. *p-Methylbenzalazine*, from PhCH : NNH_2 and *p*-MeC_6H_4CHO, pale yellow crystals, m. 112°, gives 30–5% of PhCH : CHC_6H_4Me, m. 119.6°. Furfuraldazine gives 15–20% of furfurostilbene. With aliphatic azines, however, no marked evolution of N or NH_3 could be obtained. *Di-p-chlorobenzalazine*, golden yellow scales, m. 211°, gives 25% of *di-p-chlorostilbene*, light silver-gray scales, m. 153.8°; *dibromide*, yellow ppt., m. 195–7°. Decomp. begins 284°. *Di-p-aminobenzalazine*, amorphous, dark yellow powder, m. 245°; it begins to decomp. 307° with much evolution of NH_3 and formation of tarry condensation products. No stilbene derivs. could be isolated from hydroxyazines, as they are themselves decomp. by the heat. *β-Hydroxynaphthalazine*, golden yellow crystals, m. 311.5°. Di-*o*-methoxybenzalazine begins to decomp. 270°, giving 35% of di-*o*-methoxystilbene, whose *dibromide* m. 136°. The *m*-compd. gives 30% of di-*m*-methoxystilbene, m. 97.5°, whose *dibromide* m. 183.5–4.5°. The *p*-compd. begins to decomp. 289°. *Di-o-ethoxybenzalazine*, bright yellow crystals, m. 131.6°, begins to decomp. 287°, giving 30% of *di-o-ethoxystilbene*, m. 87.5°; *dibromide*, pale yellow crystals, m. 218–9°. *Di-p-ethoxybenzalazine*, pale yellow leaflets, m. 172.3°, begins to decomp. 308°. *Di-o-benzoxybenzalazine*, yellow lamellas, m. 157.7°, gives *di-o-benzoxystilbene*, gleaming scales, m. 117.6°. *Di-p-benzoxybenzalazine*, pale yellow scales, m. 209.3°; the stilbene deriv. could not be isolated. β-Methoxynaphthal- and veratralazines gave only very slight amts. of the stilbene derivs.; from piperonalazine, none at all could be obtained. The relations between the m. p. of the above compds. are discussed. Chas. A. Rouiller.

Methoxybenzoylacetic Esters. A. Wahl and C. Silberzweig. Nancy. *Bull. soc. chim.*, 11, 25–34.—Et anisoylacetate (cf. Schoonjans, *Rec. trav. chim.*, 17, 238), prepared by the Claisen method, b_{10-12} 180–90° (partial decomp.), d_0 1.1753; *copper salt*, green crystals, m. 210°. *Isonitroso derivative*, $MeOC_6H_4COC(:NOH)CO_2Et$, obtained by Wolff's method (*Ann.*, 325, 134), m. 113–4°. *Ethyl m-methoxybenzoyl-*

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acetate, yellow oil; *copper salt*, green crystals, m. 168–9°; *isonitroso derivative*, m. 94°. *Methyl o-methoxybenzoylacetate*, b_{15} 179–80°, d_0 1.211; *sodium salt*, needles. *Copper salt*, $C_{11}H_{11}O_4Cu$, green needles, m. 170–2°, which, when boiled with MeOH, yields a blue *salt*, $C_{12}H_{14}O_5Cu$, m. 150–2° (cf. Wislicenus, *Ber.*, 31, 3157). In the preparation of the above ester is also formed *o-methoxybenzoyldehydroacetic acid*, yellow crystals, m. 215°. *Methyl m-methoxybenzoylacetate*, b_{11} 177°, d_0 1.212; *copper salt*, green crystals, m. 172–3°. *m-Methoxybenzoyldehydroacetic acid*, yellow crystals, m. 185°. *Methyl anisoylacetate*, yellowish white crystals, m. 27–8°, b_{10} 190–2°; *copper salt*, green crystals, m. 248–50°

CHAS. A. ROUILLER.

A Study of Organic Boro-nitrogen Compounds. ARDEN R. JOHNSON. *J. Physic. Chem.*, 16, 1–28.—When amines and BBr_3, generally in CCl_4, are brought together, amorphous ppts. vigorously decomp. by H_2O, are formed. These ppts., dried in air or H and kept in a desiccator, had the following comp.: *Primary amines:* $(MeNH)_3BBr$, $EtNHBBr_3$, *iso*-$C_5H_{11}NH_2BBr_3$, $PhNH_2BBr_3$. *Secondary amines:* Me_2NBBr_2, Pr_2NBBr_2, $(C_5H_{11})_2NBBr_2$, $(Ph_2NH)_3BBr_3$, $(C_5H_{10}NH)_3BBr_3 \cdot$ (piperidine); the latter rapidly loses HBr, passing into a stable compd. $C_5H_{10}NBBr_2$. *Tertiary amines:* Et_3NBBr_2, needles, quite sol. in CCl_4; $Me_2NPhBBr_2$, translucent crystals, passing over into a compd. $MeNPhBBr_2$; $C_5H_5NBBr_3$ (pyridine), passing into $C_5H_4NBBr_2$; $C_9H_7NBBr_3$ (quinoline). *Nitriles:* $MeCNBBr_3$, $EtCNBBr_3$, $PhCNBBr_3$, $PhCH_2CNBBr_3$. The following general conclusions may be drawn: With the lower primary amines, BBr_3 reacts with more than 1 mol., but HBr is readily split off; the higher members have a greater tendency to combine with only 1 mol. and less tendency to part with halogen; compds. with 5 or more C ats. form addition products quite stable at room temp. if moisture is absent. Of secondary amine compds., those of the aliphatic series are generally the simplest (mol. per mol.) but easily lose HBr; cyclic and aromatic amines combine in the proportion 3 : 1 and do not so readily lose HBr. Tertiary amines form 1 : 1 compds., that of quinoline being quite stable; alkyl and alkylphenyl compds. are much less stable and have a tendency to split off alkyl halide. Nitriles form addition products which do not lose HBr as readily as the amine compds. All react violently with H_2O, EtOH, AcH and AcOH, $B(OH)_3$ and often HBr being formed; with Me_2CO, esters and Et_2O, they react less violently than with OH solvents, in some cases apparently dissolving without change. Almost without exception, they are insol. in hydrocarbons, but if left several hrs. in contact with the solvent, the latter became red to brown, an action enhanced by sunlight. Halogen derivs. of hydrocarbons form the best media for pptg. the compds., although in $CHCl_3$ or $CHBr_3$ discoloration sets in after a time and a gel seps.

CHAS. A. ROUILLER.

Lysine Chloroplatinate. M. SIEGFRIED. Univ. Leipzig. *Z. physiol. Chem.*, 76, 234–7.—Contains further experimental proof that *dl*-lysine chloroplatinate $C_6H_{14}N_2O_2.H_2PtCl_6$ differs from the active salt in that the former does not retain alc. of crystn., when dried over H_2SO_4.

G. M. MEYER.

Preparation and Properties of α-Linolenic Acid from Linseed Oil. E. ERDMANN. Halle a/S. *Z. physiol. Chem.*, 73, 179–97.—The liquid aliphatic acids of linseed oil were obtained by sapon.; the Zn α-linolenate was purified by alc. and the free acid recrystallized from petroleum ether at —80°. It is 16–18% of the liquid acids, a clear fluid, pptd. by cooling, mol. wt. = 279–82, I no. = 269–78 (theor. 273), d. 0.9046, when fresh, or 0.9248 when older. The acid is therefore easily oxidized and forms polymers. Salts and halogen substitution products were prepared. Study of the constitution verified the work described in *C. A.*, 3, 2165–6; 4, 1295; 5, 1086.

C. C. BENSON.

Spectrochemistry of Unsaturated Compounds. K. AUWERS. Chem. Inst., Greifs-

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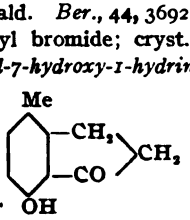
wald. *Ber.*, 44, 3679–92.—A. considers that Eisenlohr's conclusions (*C. A.*, 6, 485) are not justified by either the nature, or accuracy of the exptl. facts.

J. Bishop Tingle.

Simple Method of Formation of Hydroxyhydrindones. K. Auwers. Chem. Inst., Greifswald. *Ber.*, 44, 3692–9.—*p-Cresyl α-bromopropionate*, from *p*-cresol and α-bromopropionyl bromide; cryst., b_{18} 145–50°. Yield, about 80%. With $AlCl_3$ it gives *4-methyl-7-hydroxy-1-hydrindone* (I); needles, m. 110–1°. *Semicarbazone*, needles, m.



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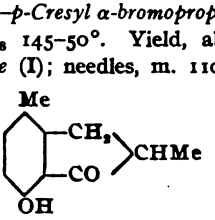

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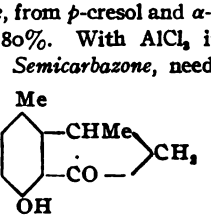

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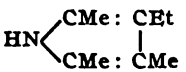
above 280°. *Phenylhydrazone*, almost colorless needles, m. 183°. *Benzal derivative*, pale yellow needles, m. 129°. *Benzoyl derivative*, needles, m. 124–5°. *Methyl ether*, needles, m. 112–3°. *Semicarbazone*, needles, m. 220–4°. *Benzal derivative*, needles, m. 185–6°. *p-Cresyl-α-bromoisobutyrate*, from *p*-cresol and α-bromoisobuteryl bromide; needles, m. 39–40°; b_{18} 152°. Yield, about 90%. With $AlCl_3$ it gives *2,4-dimethyl-7-hydroxy-1-hydrindone* (II); needles, m. 53°. *Benzoyl derivative*, needles, m. 113–4°. *Semicarbazone*, cryst., darkens about 220°, m. 230-2°. *p-Cresyl-α-bromobutyrate*, form *p*-cresol and α-bromobutyryl bromide; liquid, b_{20} 160–3°. With $AlCl_3$ it gives *3,4-dimethyl-7-hydroxy-1-hydrindone* (III); cryst., m. 53–4°. *Semicarbazone*, cryst., m. 217°, previously softening. *Benzal derivative*, yellow needles, m. 114°.

J. Bishop Tingle.

Halogen Compounds of the Normal Butane Series. J. v. Braun and H. Deutsch. Univ. Breslau. *Ber.*, 44, 3699–706.—*1-Phenoxy-3,4-dibromobutane*, $PhOCH_2CH_2CHBrCH_2Br$, from phenoxybutylene and Br; oil, b_{18} 191–4°. With aq. HBr it gives *1,3,4-tribromobutane*, $BrCH_2CH_2CHBrCH_2Br$; liquid, b_{10} 115–7°. Yield, above 75%. With Mg it gives the *compound*, $CH_2 : CHCH_2CH_2MgBr$. With CO_2 it forms allylacetic acid and with BzH *phenylbutenylcarbinol*, $CH_2 : CHCH_2CH_2CHPhOH$; liquid, b_{11} 125°. Yield, 70%. *1-Phenoxy-3-bromobutane*, $PhOCH_2CH_2CHMeBr$, from phenoxybutylene and HBr; oil, b_9 130–1°. With KCN it forms *1-phenoxy-3-cyanobutane*, $PhOCH_2CH_2CHMeCN$; liquid, b_{10} 156–7°. Alk. KOH hydrolyzes it to *α-methyl-γ-phenoxybutyric acid*, $PhOCH_2CH_2CHMeCO_2H$; cryst., m. 79°. *Silver salt.* J. B. T.

Hemopyrrole. Richard Willstätter and Yasuhiko Asahina. Zurich. *Ber.*, 44, 3707–10; cf. Knorr and Hess (*C. A.*, 6, 92) and H. Fischer and Bartholomäus (*C. A.*, 6, 492).—Hemopyrrole from hemin and also from chlorophyll is a mixt. of phyllopyrrole (I) (m. 66–7°), isohemopyrrole (m. 16–7°) (II or III) and hemopyrrole,



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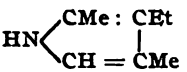

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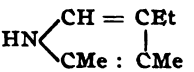

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liquid (II or III). K. and H.'s results are mostly confirmed, but the cryst. dimethylacetylpyrrolehydrazone could not be isolated. Dimethylethylpyrrole, b_{10} 83–8°; b_{710} 197°; d_4^0 0.926; d_4^{20} 0.913. Yield, about 13% of the Ac compd. Picrate, m. 136° (138° cor.). *Styphnate*, prisms, m. 136°. *Chloropicrate*, prisms, m. 140°. HNO_2 oxidizes the base to methylethylmaleicimideoxime, m. 215–6°. It is not identical with either of the oximes from hemopyrrole. HI and P, followed by Pt and H, reduce dimethylethylpyrrole to *dimethylethylpyrrolidine*, $C_8H_{15}N$; b. 145°. *Chloroplatinate*,

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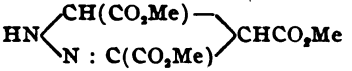
golden yellow prisms, m. 220°. *α-Naphthylcarbamide*, plates, m. 109–10°. *Isohemopyrrolidinenaphthylcarbamide*, m. 138°. *Chloroplatinate*, m. 191–2°.

J. Bishop Tingle.

Constitution of E. D. Buchner's "Pyrazolinecarboxylic Acids." Carl Bülow. Univ. Tübingen. *Ber.*, 44, 3710–6.—Buchner's "pyrazolinecarboxylic acids" from aliphatic diazo compds. and mono- or dicarboxylic acids of the C_2H_4 series are considered to be open-chain compds. because of their reactions. Thus the compd. from Me diazoacetate and Me fumarate is *trimethyl glyoxylazinoxalacetate*, $MeO_2CCH : NN:C(CO_2Me)CH_2CO_2Me$, and not tri-Me pyrazoline-3,4,5-tricarboxylate,

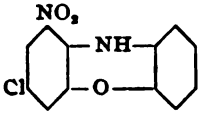


J. Bishop Tingle.

Fagaramide, a New Substance, Containing Nitrogen from the Root of Fagara xanthoxyloides, Lam. H. Thoms and F. Thümen. Univ. Berlin. *Ber.*, 44, 3717–30.—C_6H_6 exts. from the root of *Fagara xanthoxyloides*, Lam, *piperonyl-4-acrylicisobutylamide* ("*fagaramide*"), $H_2C : O_2 : C_6H_3CH : CHCONHCH_2CHMe_2$, which is also formed from piperonyl-4-acryl chloride and isobutylamine; crystals, m. 119–20°; mol. wt., in freezing PhOH, 225–36. Yield, 0.075% of the root. *Dibromo derivative*, crystals, m. 154–5°, previously darkens and decomp. $KMnO_4$ oxidizes it to piperonaldehyde and piperonylic acid (m. 230° not 227.5–8°). Alc. KOH hydrolyzes the amide to piperonyl-4-acrylic acid, m. 242°, not 238°, or 232°, and isobutylamine. Hydrochloride, m. 177–8°, not 160°. *Piperonyl-4-acrylicbutylamide*, from the chloride and amine; crystals, m. 85–6°. Yield, 60%. *Dibromo derivative*, needles, decomp. 132°, m. 134–5°. *Piperonyl-4-acrylic-sec.-butylamide*, needles, m. 161–2°. Yield, about 130% of the amine. *Dibromo derivative*, cryst., decomp. 163°, m. 164–5°. *Piperonyl-4-acrylic-tert.-butylamide*, pale yellow prisms, m. 138–9°. Yield, about 150% of the amine. *Dibromo derivative*, needles, decomp. 180°, m. 182–3°. The above amides have a narcotic action on cold-blooded animals, but, in small doses, are without apparent action on warm-blooded species.

J. Bishop Tingle.

Dinitrophenols. IV. Fritz Ullmann and Shrirang M. Sane. Berlin. *Ber.*, 44, 3730–7; cf. *C. A.*, 3, 436.—*2,5-Dichloro-1,3-dinitrobenzene*, from 4-chloro-2,6-dinitrophenol, *p*-toluenesulfonyl chloride and $PhNEt_2$; plates, m. 105° (cor.). Yield, 76%. *4-Chloro-2,6-dinitrophenyl-4-toluenesulfonate*, $(O_2N)_2C_6H_2ClOSO_2C_6H_4Me$, from 4-chloro-2,6-dinitrophenol, *p*-toluenesulfonyl chloride and aq. Na_2CO_3; needles, m. 127° (cor.). Yield, 91%. In b. xylene, with NH_3, it gives 4-chloro-2,6-dinitroaniline. Alc. Me_2NH and 2,5-dichloro-1,3-dinitrobenzene forms 4-chloro-2,6-dinitrodimethylaniline. *4-Chloro-2,6-dinitrodiphenylamine*, $(O_2N)_2C_6H_2ClNHPh$, from 4-chloro-2,6-dinitrophenyl 4-toluenesulfonate, or the crude nitration product of 2,5-dichloronitrobenzene and $PhNH_2$; orange-yellow needles, m. 130°. Yield, about 48%. With *o*-aminophenol and AcONa, instead of $PhNH_2$, the product is *2-chloro-4-nitrophenoxazine*,



; violet needles, m. about 192°, decomp. 210°. Yield, 84%. *5,6-Dichloro-1,3-dinitrobenzene*, from 6-chloro-2,4-dinitrophenol, *p*-toluenesulfonyl chloride and $PhNEt_2$; yellow plates, m. 56°. Yield, 80%. With NH_3 it gives *2-chloro-4,6-dinitroaniline*, yellow needles, m. 157°. *2-Chloro-4,6-dinitrodiphenylamine*, from $PhNH_2$, like the preceding compd.; brick-red crystals. 2,4-Dinitrophenoxyazine from 5,6-dichloro-1,3-dinitrobenzene, *o*-aminophenol and $NaNO_2$. *2,4-Dinitro-6-methylphenyl-p-toluenesulfonate*, from 2,4-dinitro-6-methylphenol, *p*-toluenesulfonyl chloride

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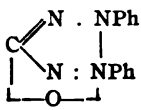
and aq. Na_2CO_3; needles, m. 167° (cor.). The compd. of Reverdin and Crépieux (*Ber.*, 35, 1444 (1902)) (m. 108–9°) by nitrating *o*-tolyl toluenesulfonate must have a different constitution. 2,4-Dinitro-6-methylphenol, *p*-toluenesulfonyl chloride and $PhNEt_2$ give the above ester together with 2-chloro-3,5-dinitrotoluene; m. 63°. It is identical with Nietzki and Rehe's compd. ("m. 45°") formed by nitrating *o*-chlorotoluene. With *o*-aminophenol it gives *2,4-dinitro-6-methyl-2'-hydroxydiphenylamine;* reddish brown plates, m. 177° (cor.). Alc. and dil. aq. NaOH convert it into *2,4-dinitro-6-methylphenoxazine*; brown needles, m. 205° (decomp.). Me 3,5-dinitro-2- and 4-chlorobenzoates from *p*-toluenesulfonyl chloride, $PhNEt_2$ and Me 3,5-dinitro-2- or 4-hydroxybenzoates. Yields, 69 and 80%, resp. J. Bishop Tingle.

Cazeneuve's Diphenylcarbodiazone and the Diphenylcarbazone. Eug. Bamberger. Zurich. *Ber.*, 44, 3743–54.—Cazeneuve's "diphenylcarbodiazone" $(PhN : N)_2CO$, from diphenylcarbazide, or diphenylcarbazone (*Bull.*, [3] 25, 375 (1901)) is identical with Bamberger and Blaskopf's hydroxydiphenyltetrazolium betaine,  from nitroformazyl and AcOH (*Arch. Sci. phys. nat. Geneva*, [4] 6, 384 (1898)). J. Bishop Tingle.

Rate of Transformation of Syn- into Anti-oximes. Thomas S. Patterson and Andrew McMillan. *Proc. Phil. Soc. Glasgow*, 1911, reprint 7 pp.; through *J. Chem. Soc.*, 100, I, 648.—The following mean values have been obtained for 1000 *k*, at 26°; benz-*syn*-aldoxime, 6.38; *p*-tolyl-*syn*-aldoxime, 5.18; anis-*syn*-aldoxime, 6.82; piperonal-*syn*-aldoxime, 3.59; *o*-nitrobenz-*syn*-aldoxime, 1.10; *m*-nitrobenz-*syn*-aldoxime, 4.16; *p*-iodobenz-*syn*-aldoxime, 5.335. *p*-Nitrobenz-*syn*-aldoxime transforms into the *anti*-oxime too rapidly for measurement. J. Bishop Tingle.

Electrolytic Reduction of Levulic Acid and of α-Dimethyllevulic Acid. Julius Tafel and Bruno Emmert. *Z. Electrochem.*, 17, 569–72; through *J. Chem. Soc.*, 100, I, 764.—Levulic and dimethyllevulic acids are reduced, in alk. soln., to the corresponding hydroxy acids, or lactones. In acid soln. levulic acid is reduced to valeric acid, but dimethyllevulic acid gives chiefly the lactone, dimethylvaleric acid being also formed in small quantity. Hydroxyvaleric acid, valerolactone and α-dimethylvalerolactone were not reduced at all under the conditions employed; consequently these substances cannot be regarded as intermediate products in the reduction of the aliphatic acids. J. Bishop Tingle.

Action of Sodium and of Potassium Hydroxides on the Optical Behavior of Dextrose in Solution. S. C. Profilo. *Rend. accad. sci. fis. mat. Napoli*, [III *A*] 17, 174–81; through *J. Chem. Soc.*, 100, I, 769.—In presence of a fairly high conc. of NaOH, or KOH, a soln. of dextrose, which is at first *d*-rotatory, slowly diminishes in optical activity and becomes *l*-rotatory. After a long interval the *l*-rotation diminishes so that the soln. is optically neutral. It is possible that, after a further interval, the soln. would again become *d*-rotatory, but readings ultimately became impossible because of the depth of color of the soln. It is suggested that an equil. mixt. of dextrose $\rightleftarrows$ levulose $\rightleftarrows$ mannose is ultimately formed, the sign of rotation depending on the relative proportions of these substances. J. Bishop Tingle.

New Derivatives of Cyclohexanones. Icilio Guareschi. *Atti r. accad. sci. Torino*, 46, 662–9; through *J. Chem. Soc.*, 100, I, 792–3.—*α,α'-Dicyanocyclohexane-1,1-diacetimide* (I), from cyclohexanone and Et cyanoacetate; needles, m. 211–2°. *Ammonium salt. Dibromo derivative*, $C_{12}H_{13}O_2N_3Br_2$, from the imide and Br water; m. 164–5° (Br evol.). With HCO_2H it gives *α,β-dicyano-α,β-cyclohexanesuccinimide*

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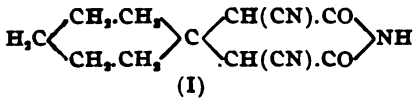

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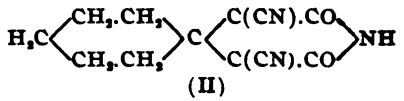
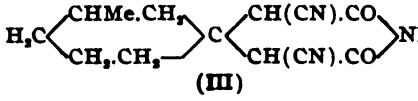


(II)

(II); needles, m. 238–40°. *α,α'-Dicyano-1-methylcyclohexane-3,3-diacetimide* (III),



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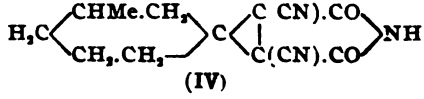

(IV)

from 1-methylcyclohexane-3-one; m. 240–1° (darkens); m. 244–5° (Maquenne block). *Ammonium salt*, cryst. *Dibromide*. It gives *α,β-dicyano-α,β-1-methylcyclohexane-3,3-succinimide* (IV); m. 241–2° (Maquenne block). J. BISHOP TINGLE.

Velocity of Racemization. WALTER HERZ. *Jahresber. Schles. Ges. vaterland Kult*, 1911, reprint; through *J. Chem. Soc.*, 100, II, 974.—The rate at which racemization of hyoscyamine, scopolamine and tropine occurs in presence of alkali is represented by the equation $kt = \log e\,[a/(a-2x)]$, where a is the initial conc. and x the amt. changed. At 5°, in presence of NaOH, the racemization const. for hyoscyamine is 6.5×10^{-3}, for tropine, 1.9×10^{-2}; at 2–4°, for scopolamine, 0.77, for tropine 1.9×10^{-2}. This method may be used for measurement of OH^- concs. J. B. T.

Doubly Linked Carbon Atoms and the Carbon-Nitrogen Linking. VIII. Reduction of *N*-Alkylated Amino Ketones. HERMANN EMDE AND ERNST RUNNE. *Arch. Pharm.*, 249, 354–70; through *J. Chem. Soc.*, 100, I, 714–5; cf. *C. A.*, 5, 2245, 2470, 2818.—*α-Phenylacetonyltrimethylammonium bromide*, $AcCHPhNMe_3Br$, from α-bromo-α-phenylacetone and NMe_3; oil. *Chloroaurate*, m. 158–9°. *Chloroplatinate*, m. 207–8° (decomp.). The chloride is not changed by Zn and dil. H_2SO_4, but is decomp. by Na–Hg and dil. HCl to NMe_3, phenylacetone and its carbinol. *α-Phenylacetonyldimethylamine hydrochloride*, $AcCHPhNMe_2.HCl$, from α-bromo-α-phenylacetone and Me_2NH; m. 193–5°. With acid and Na–Hg it gives α-phenylacetone and Me_2NH. *α-Phenylacetonylmethylamine hydrochloride*, AcCHPhNHMe.HCl, from $MeNH_2$, m. 210–1° (decomp.). With Na–Hg it gives chiefly *α-methylimino-α-phenylisopropyl alcohol*, MeNHCHPhCHMeOH; yellow oil. *Hydrochloride*, m. 191–3°. *Chloroplatinate*, m. 193–4° (decomp.). Betaine hydrochloride is scarcely attacked by Na–Hg. These results and others from the literature lead to the conclusion that CO, except when present in CO_2H, diminishes the stability of a neighboring C-N linkage during reduction. This diminution is greater than that caused by a C : C linkage under otherwise identical conditions. In a compd. $RCH_2(NH_2)COR'$(? $RCH(NH_2)COR'$), 3 factors exert an influence in weakening the CN linkage, *viz.*, C : C linkages in R, the CO groups and the loading of NH_2 with Me. The influence of this last factor is very slight for primary and secondary amino groups (cf. following abstr.). J. BISHOP TINGLE.

Doubly Linked Carbon Atoms and the Carbon-Nitrogen Linking. IX. Arylamino Alcohols. HERMANN EMDE AND ERNST RUNNE. *Arch. Pharm.*, 249, 371–82; through *J. Chem. Soc.*, 100, I, 718; cf. preceding abstr.—α-Amino-α-phenylisopropyl alc. is best obtained from benzyl Me ketoxime, Na–Hg and dil. HCl. Yield, 43.5%. Its hydrochloride with MeI and MeONa gives the tri-Me-ammonium chloride, which, with Na–Hg, forms Me_3N and phenylisopropyl alc. These are also obtained from the ammonium iodide and HCl, at 170–80°. *dl*-α-Isoephedrine-HCl (α-methylamino-α-phenylisopropyl alc. hydrochloride) decomp. 250° into benzyl Me ketone, NH_3 and MeCl. α-Phenyl-γ-butaneoltrimethylammonium chloride and Na–Hg give α-phenyl-γ-butaneol and $Me_3N.HCl$. *Methyldiethylhydroxyethylammonium iodide*, $HOCH_2CH_2NMeEt_2I$, from hydroxyethyldiethylamine and MeI; m. 249° (decomp.). *Chloro-*

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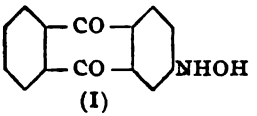
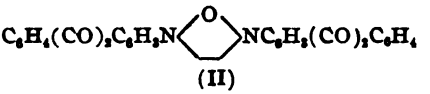
platinate, decomp. 222–3°. *Chloroaurate*, decomp. 237–8°. The *chloride* is scarcely attacked by Na–Hg. J. Bishop Tingle.

Mechanism of the Indanthrene Fusion of 2-Aminoanthraquinone and Investigation of 2-Hydroxylamino and of 2,2′-Azoxyanthraquinone. R. Scholl and Fritz Eberle. *Monatsh.*, 32, 1035–42.—*2-Hydroxylaminoanthraquinone* (I), from 2-nitro-

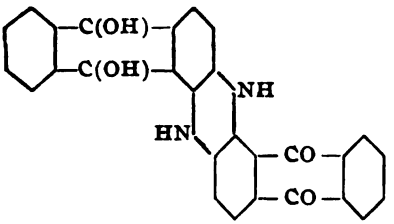


(I)



(II)

anthraquinone, grape sugar, aq. KOH and H_2O; orange-red solid, softens about 140°, m. 158-60°. Yield, very small. It does not form indanthrene when fused with KOH, or $ZnCl_2$. *2,2′-Azoxyanthraquinone* (II), is formed with (I) and also from (I) and air, in presence of alkali; light brown prisms and plates from $PhNO_2$, m. 342.5°. Alc., or aq. $(NH_4)_2S$, or $Sn(OH)_2$ + NaOH reduce it to 2-aminoanthraquinone. These results indicate that the formation of dihydroindanthrene (III), by fusion of 2-amino-



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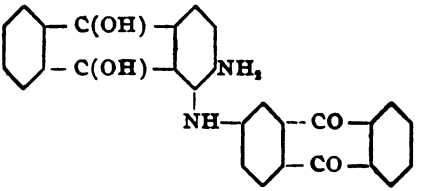
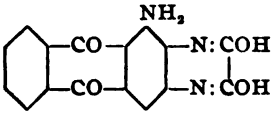


(IV)

anthraquinone and KOH, is probably preceded by that of dihydro-2-amino-1,2′-dianthraquinonylamine (IV). J. Bishop Tingle.

Azines and Quinonediazides of the Anthraquinone Series. R. Scholl, Fritz Eberle and Walter Tritsch. *Monatsch.*, 32, 1043–56.—*2,3-Dihydroxypyrazino-1-aminoanthraquinone* (*dihydroxy-1-amino-2,3-anthraquinoxalinoquinone*) (I), from



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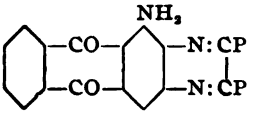

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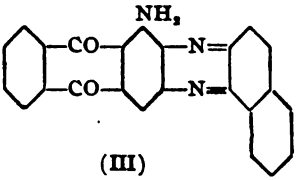
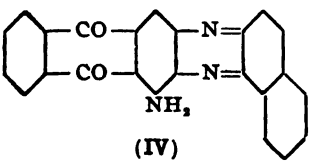


(III)

1,2,3-triaminoanthraquinone and anhydrous $C_2H_2O_4$; dark brown needles, not m. 400°. *2,3-Diphenylpyrazino-1-aminoanthraquinone* (II), from 1,2,3-triaminoanthraquinone, benzil and glacial AcOH; red or reddish brown needles, m. 241°. It sublimes. *2,3-(1′,2′)-Naphthazino-1* (*or -4*)*-aminoanthroquinone* (*1′,2′-naphth-1-*(*or-4*)*-amino-2,3-anthraquinoneazine*) (III or IV), like (II), from 1,2-naphthoquinone;



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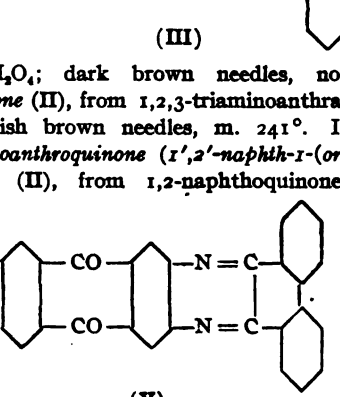

(V)

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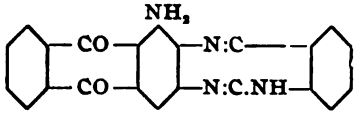
dark brown and amorphous, m. 266–7°. *2,3-(9,'10')-Phenanthrazino-1-aminoanthraquinone* (*9',10,-phenanthro-1-amino-2,3-anthraquinoneazine*) (V) like (II), from phenanthrenequinone; reddish brown needles from $PhNO_2$, m. 361°. *2,3-* (*α,β*)-*Indazino-1-(or -4)-aminoanthraquinone* (*α,β-indo-1-(or -4)-amino-2,3-anthraquinoneazine*) (VI



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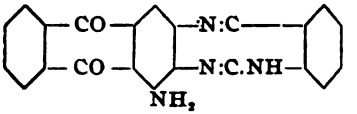
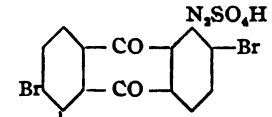
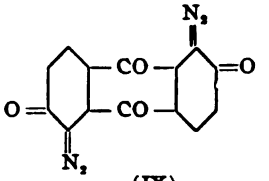


(VII)

or VII), like (II), from isatin; dark brown, cryst. powder, m. above 400°. The quinonediazides of the anthraquinone series described below do not form azo dyes with the naphthols or naphthylamines. *2,6-Dibromoanthraquinone-1,5-bisdiazonium sulfate* (VIII), from 2,6-dibromo-1,5-diaminoanthraquinone; yellowish red crystals,

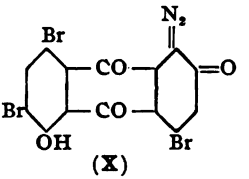


(VIII)



(IX)

decomp. 185–6°. B., dil. H_2SO_4 decomp. it into *anthraquinone-2,1,6,5-bisquinonediazide* (IX); green lustrous crystals, explodes 156° (rapid heating). Yield, 75%. *Hydrochloride*, light brown. Prolonged b. of (VIII) with abs. alc. gives 2,6-dibromoanthraquinone. Yield, about 80%. *4,6,8-Tribromo-5-hydroxyanthraquinone-2,1-quinone-*



(X)

diazide (X), from 2,4,6,8-tetrabromo-1,5-diaminoanthraquinone; crystals, chars and softens above 360°. J. Bishop Tingle.

Behavior of Nitrosomonoarylcarbamides towards Primary Amines and Phenols. J. Haager. Vienna. *Monatsh.*, **32**, 1089–102.—Phenyl-, *p*-tolyl- and *m*-xylylcarbamides are formed from nitrosophenylcarbamide, $H_2NCONPhNO$, and $PhNH_2$, *p*-toluidine and *m*-xylidine, resp. In pres. of a solvent, such as MeOH, nitrosophenylcarbamide and $PhNH_2$ give diazoaminobenzene and phenylcarbamide. *p*-Toluidine gives *p*-tolylcarbamide and phenylaminodiazotoluene. Benzeneazophenol is formed from nitrosophenylcarbamide and PhOH. Resorcinal, *o*- and *m*-hydroxybenzoic acids and *α*- and *β*-naphthols react similarly. *p*-Nitrosotolylcarbamide and resorcinol give *p*-tolueneazoresorcinol. In the above reactions the group $CONH_2$ is eliminated from the carbamide. J. Bishop Tingle.

Condensation Products of Methylcarbazole and Phthalic Anhydride. Franz Ehrenreich. Univ. Prague. *Monatsh.*, **32**, 1103–14.—*N*-Methylcarbazole is best prepared from K carbazole and MeI, or Me_2SO_4, at the ordinary temp. Yield, quant. With C_6H_6, $AlCl_3$ and phthalic anhydride it gives chiefly the monophthaloylic acid, with some diphthaloylic acid. *N-Methylcarbazole-3-phthaloylic acid* formula (I) below, rhombic crystals, m. 232°. Yield, 80% of the methylcarbazole. *Methyl ester*, from

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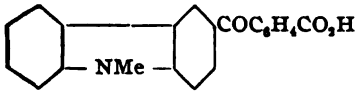
the Ag salt and also from the chloride; monoclinic prisms, m. 146°. *N-Methylcarbazole-3,7-diphthaloylic acid* (II), slender needles, m. 330°. Yield, 30% of the methyl-



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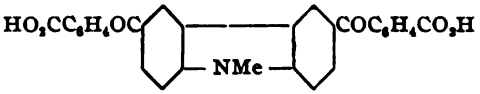
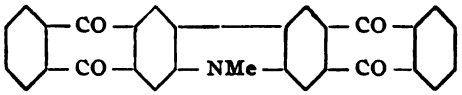


(II)

carbazole. *Dimethyl ester*, from the Ag salt; prisms, m. 196°. Yield, almost quant. Conc. H_2SO_4 and (II) forms *2,3,6,7-diphthaloyl-N-methylcarbazole* (III); reddish yellow



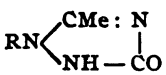
(III)

plates from quinoline, not m. 400°. No isomeric ester could be obtained from (I) by either method. J. Bishop Tingle.

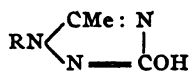
Phylloxanthin Question. L. Marchlewski. Cracow. *Ber.*, **45**, 24–5.—Allochlorophyllan (*C. A.*, **5**, 3252) is identical with Tzvyet's "chlorophyllan *β*", except that it exhibits no absorption between *λ* 628–22 *μμ*. It is also essentially identical with Schunck's "phylloxanthin" except that it contains a little less (30.02%) phytol. This indicates that S.'s compd. has either lost some of its phytol, or else that it contains, in small quantity, a substance free from phytol. Phylloxanthin from stinging nettles (1911) although optically identical with allochlorophyllan, differs from in it not giving phytol when hydrolyzed. The hydrolysis product from phylloxanthin is white and flocculent. The colored hydrolysis products from phylloxanthin and from allochlorophyllan are identical. J. Bishop Tingle.

Reduction of Semicarbazones. S. Kessler and H. Rupe. Univ. Basel. *Ber.*, **45**, 26–30.—*Benzylsemicarbazine*, $PhCH_2NHNHCONH_2$, from benzaldehydesemicarbazone, alc. and Na-Hg; plates, m. 155°. Yield, 65–70%. *Hydrochloride*, needles, m. 178–80°. *Sulfate*, needles, m. 158°. *Picrate*, yellow needles, m. 161–2°. *Oxalate*, m. 178–9° (decomp.). *Acetyl derivative*, plates, m. 207°, *Benzoyl derivative*, from Bz_2O; needles from $PhNO_2$, m. 230°. *Nitroso derivative*, $PhCH_2N(NO)NHCONH_2$, needles, m. 133° (decomp.). It exhibits Liebermann's reaction and evolves N_2H when b. with dil. H_2SO_4. [*p-Methylbenzyl*]-*semicarbazine*, $MeC_6H_4CH_2NHNHCONH_2$, from *p*-toluylaldehydesemicarbazone; needles, m. 158°. Yield, 65%. *Hydrochloride*, needles, m. 138° (decomp.). *Sulfate*, needles, decomp. 187°. *Picrate*, yellow needles, m. 178° (decomp.). *Acid oxalate*, decomp. 175°. *Acetyl derivative*, plates, m. 225°. *Nitroso derivative*, plates, m. 126–7° (decomp.). Hydrocinnamic aldehydesemicarbazone is formed by reducing cinnamic aldehydesemicarbazone and benzylacetonesemicarbazone similarly from benzalacetonesemicarbazone. Yield, 80%. Cf. following abstr. J. Bishop Tingle.

Reduction of Semicarbazones and Formation of Hydroxytriazoles. H. Rupe and E. Oestreicher. Univ. Basel. *Ber.*, **45**, 30–8; cf. preceding abstr.—*3,4-Methylenedioxybenzylsemicarbazine*, $CH_2 : O_2 : C_6H_3CH_2NHNHCONH_2$, from piperonaldehydesemicarbazone and Na-Hg; prisms, m. 184°. *Acetyl derivative*, needles, m. 203–4°. *Formyl derivative*, plates, m. 204–5°. *1-Methyl-3-hydroxy-5-*[*3,4-methylenedioxybenzyl*]-*triazole* formula (I), or (II) below (R = $CH_2 : O_2 : C_6H_3CH_2$) from the Ac



(I)



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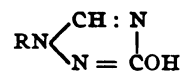

(III)

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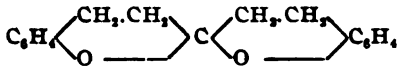
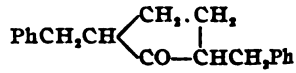
deriv. and aq. NaOH; quadratic crystals, m. 190°. *3-Hydroxy-5-[3,4-methylenedioxybenzyl]-triazole* (III; R = $CH_2 : O_2 : C_6H_3CH_2$), from the formyl deriv. above; plates, from alc. + HCO_2H, m. 266–7°. *Phenethylsemicarbazine*, $PhCHMeNHNHCONH_2$, from acetophenonesemicarbazone; prisms, m. 142–3°. *Acetyl derivative*, plates, m. 228–30°. *Formyl derivative*, needles, m. 187°. *1-Methyl-3-hydroxy-5-phenethyltriazole* (II; R = PhCHMe), from the Ac deriv. and $Ba(OH)_2$; prisms, m. 146–7°. *3-Hydroxy-5-phenethyltriazole* (III; R = PhCHMe), prisms, m. 140°. *Diphenylmethylsemicarbazine* $PH_2CHNHNHCONH_2$, from benzophenonesemicarbazone; needles, m. 164–5°. *Acetyl derivative*, prisms, m. 237°. *Formyl derivative*, needles, m. 182°. *Nitrosoamine*, pale yellow needles, m. 122°. It exhibits Liebermann's reaction and evolves NH_3 with b., dil. H_2SO_4. *1-Methyl-3-hydroxy-5-[diphenylmethyl]-triazole* (II; R = Ph_2CH), from the Ac deriv., needles. *3-Hydroxy-5-[diphenylmethyl]-triazole* (III; R = Ph_2CH), from the formyl compd.; needles, m. 253°. *Sodium salt.* *[1,2-Diphenylethyl]-semicarbazine*, $PhCH_2CHPhNHNHCONH_2$, from desoxybenzoinsemicarbazone; needles, m. 139°. *Acetyl derivative*, needles, m. 196°. *Formyl derivative*, prisms, m. 194°. *o-Hydroxybenzylsemicarbazine*, $HOC_6H_4CH_2NHNHCONH_2$, from salicylic aldehydesemicarbazone; prisms, m. 128°. *Acetyl derivative*, needles, m. 204°. *Formyl derivative*, prisms, m. 183–4°. *1-Methyl-3-hydroxy-5-[2'-hydroxybenzyl]-triazole* (II; R = $HOC_6H_4CH_2$), from the Ac compd.; rods, m. 192°. *3-Hydroxy-5-[2'-hydroxybenzyltriazole* (III; R = $HOC_6H_4CH_2$), from the formyl compd.; plates, m. 211° (decomp.). *1-Methyl-3-hydroxy-5-benzyltriazole* (II; R = $PhCH_2$), from acetylbenzylsemicarbazine; prisms, m. 168°. *3-Hydroxy-5-benzyltriazole* (III; R = $PhCH_2$), from formylbenzylsemicarbazine and $Ba(OH)_2$; plates, m. 147–8°. These results show that Na-Hg reduces to semicarbazines only those semicarbazones which contain a C_6H_5 nucleus directly linked to the C : N group. J. B. T.

Chemical Action of Light. XXII. Autoöxidation. I. GIACOMO CIAMICIAN AND P. SILBER. Bologna. *Ber.*, 45, 38–43.—The hydrocarbons mentioned below were mixed with H_2O and O and insolated. Toluene gave BzH, BzOH (12%) and HCO_2H. *p*-Xylene gave *p*-toluic and terephthalic acids and HCO_2H. *m*-Xylene gave *m*-toluic and isophthalic acids and HCO_2H. *o*-Xylene gave *o*-toluylic acid and HCO_2H. *p*-Cymene gave an aldehyde, *p*-isopropyl-, *p*-[methylvinyl]- and *p,α*-hydroxyisopropylbenzoic acids and HCO_2H. The above changes do not occur in darkness. Phenanthrene and *o*- and *p*-nitrotoluene are not oxidized to acids under the conditions described above. J. BISHOP TINGLE.

Reduction by Paal's Method of Ketones Containing Multiple Ethylene Linkages and Crossed Double Linkages. W. BORSCHE. Univ. Göttingen. *Ber.*, 45, 46–53.—The reductions were made in presence of colloidal Pd. Dibenzalacetone gives dibenzylacetone, $(PhCH_2CH_2)_2CO$, and a *compound*; white needles, m. 126°. Dianisalacetone gives *1,5-bis-p-methoxyphenylpentane-3-one*, $(MeOC_6H_4CH_2CH_2)_2CO$; needles, m. 52°. Di-*o*-cumaryl ketone gives *1,5-bis-o-hydroxyphenylpentane-3-(1)*; $(HOC_6H_4CH_2CH_2)_2CO$; resin. When distilled it gives *tetrahydrodiphenospiropyrane*; needles, m. 110°; b_{16} 217°. Dibenzalcyclopentanone gives 1,3-dibenzylcyclopentane-2-one (II); needles, m. 47°; b_{12} 232–3°. Dibenzalcyclohexanone gives *1,3-dibenzyl-*

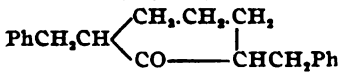


(I)



(II)

cyclohexane-2-one (III); crystals, m. 114°. Yield, quant. Dibenzalsuberone gives



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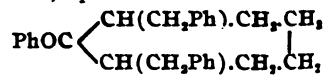

(IV)

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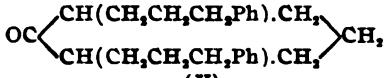
1,3-dibenzylcycloheptane-2-one (IV); oil, b_{22} 261–2°. Cinnamalacetophenone gives *phenyl δ-phenylbutyl ketone*, $BzCH_2(CH_2)_2CH_2Ph$; liquid, b_{16} 225–6°. *Oxime*, prisms, m. 81–2°. With PCl_5 it gives *δ-phenylvaleranilide*, $PhCH_2(CH_2)_2CH_2CONHPh$, which was also prepared from δ-phenylvaleryl chloride and $PhNH_2$; plates, m. 89–90°. Benzalcinnamalacetone gives *1,7-diphenylheptane-3-one*, $PhCH_2CH_2COCH_2(CH_2)_2CH_2Ph$; liquid, b_{14} 239°. *Semicarbazone*, liquid. *Phenylcarbamylhydrazone*, $PhCH_2CH_2C(:NNHCONHPh)CH_2(CH_2)_2CH_2Ph$, needles, m. 122–3°. Dicinnamalacetone gives *1,9-diphenylnonane-5-one*, $(PhCH_2[CH_2]_2CH_2)_2CO$; cryst., m. room temp.; b_{13} 258–60°. *Oxime* and *semicarbazone*, oily. *Phenylcarbamylhydrazone*, needles, m. 129-30°. Dicinnamalcyclohexanone gives *2,6-bis-ω-phenylpropylcyclohexanone* (V); oil, b. 276–8°.



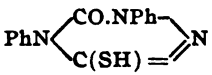
(V)

J. Bishop Tingle.

Nitration of Arsanilic Acid. L. Benda. Mainkur. *Ber.*, 45, 53–8.—Diazoarsanilic acid, 2,4,6-trinitroaniline and *3,5-dinitro-4-arsanilic acid*, $(O_2N)_2C_6H_2NH_2AsO_3H_2$, from arsanilic acid, HNO_3 and H_2SO_4; brownish yellow needles, or plates. With Br-H_2O it gives 2,6-dinitroaniline. Warm, aq. KOH hydrolyzes it to NH_3 and 4-hydroxy-3,5-dinitrophenylarsinic acid, $(O_2N)_2C_6H_2(OH)AsO_3H_2$. *Sodium salt*, egg-yellow needles. *Potassium salt*, orange-red. In an acid bath the acid dyes wool yellow. 3,5-Dibromo-4-aminophenylsulfonic acid and 2,4,6-tribromoaniline diazotizes readily, 2,6-dinitro-4-bromoaniline diazotizes slowly and incompletely and 2,4,6-trinitroaniline could not be diazotized. J. Bishop Tingle.

Phenyl Sodium Carbonate as Intermediate Product in Kolbe's Salicylic Acid Synthesis. C. H. Sluiter. s'Hertogenbosch, N. Brabant. *Ber.*, 45, 59–62.—Di-Ph carbonate and NaOH react in 2 ways giving (1) Na_2CO_3 and PhOH; (2) Na Ph carbonate and PhOH. The Na Ph carbonate decomp. in 2 ways giving (1) PhONa and CO_2 (60%); (2) Na salicylate (40%). These results are valid at 160°, under 1 atm.; they indicate that $NaOCO_2Ph$ may be an intermediate product in Kolbe's salicylic acid synthesis. J. Bishop Tingle.

Determination of the Configuration of Stereoisomeric Hydrazones. M. Busch, Univ. Erlangen. *Ber.*, 45, 73–85.—*Ethyl 2,4-diphenylsemicarbazine-1-dithiocarboxylate.* $PhNHCONPhNHCS_2Et$, from PhOCN and Et phenyldithiocarbazinate; needles, m. 149–50°. Alc. KOH converts it into mercaptan and 1,4-diphenyltriazolone-3-thiol, (I).



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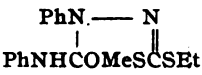

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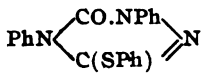
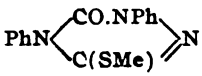


(III)

Ethyl methyldithiocarbonate diphenylsemicarbazone (II), from Me diphenylsemicarbazinedithiocarbonate, alc., KOH and EtI; needles, or prisms of the monoclinic system, m. 87–8°. Alc. KOH converts it into mercaptan and *1,4-diphenyltriazolone-3-thioethane* (III), which was also prepared from the K salt of (I) and EtI and from $COCl_2$ and β-diphenylthiosemicarbazyl ethyl ether; needles, m. 111–2°. An *isomer* (IV)

(IV)



(V)

(VI)

of (II) is formed from Et 2,4-diphenylsemicarbazine-1-dithiocarboxylate, alc., KOH and MeI; needles of the rhombic system, m. 93–4°. Alc. KOH hydrolyzes (IV) to EtSH and 1,4-diphenyltriazolone-3-thiomethane (V); (II) and (IV) have identical

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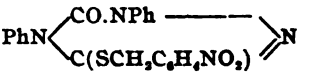
mol. wts. and are, therefore, stereoisomers. *p-Nitrobenzyl 2,4-diphenylsemicarbazine-1-dithiocarboxylate*, $PhNHCONPhNHCS_2CH_2C_6H_4NO_2$, from PhOCN and *p*-nitrobenzyl phenyldithiocarbazinate; needles, m. 119–20° (gas evolution). *Potassium salt*, yellow. With MeI it gives *p-nitrobenzyl methyl dithiocarbonate diphenylsemicarbazone* (VI); yellow needles, m. 126°. Yield, about 90%. At 130–40° it forms an equil. mixture of (VI) and (VII). Alc. KOH hydrolyzes (VI) to (V). The stereoisomer (VII) of

(VII)



(VIII)

(VI) is obtained from Me diphenylsemicarbazinedithiocarbonate and *p*-nitrobenzyl chloride; quadratic plates, m. 147°. B. alc. transforms it partly into (VI). With alc. KOH it gives MeSH and *1,4-diphenyltriazolone-3-thio-4'-nitrophenylmethane* (VIII), which is also formed from *p*-nitrobenzyl chloride and the K salt of (I); needles, m. 178–9°. The dithiocarbonic ester semicarbazones are also produced from PhOCN and the dithiocarbonic ester hydrazones. The fact that a compd. is colorless and that its isomer is colored is no proof that they are not stereoisomers. J. B. T.

Chromi- and Ferri-acetates (WEINLAND). 6. Decomposition of Trinitrotoluene (VEROLA). 24. Compounds of Platinum with Organic Selenides (FRITZMANN). 6. Chemico-crystallographic Contributions (WAGNER). 6.

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11. BIOLOGICAL CHEMISTRY.

WILLIAM J. GIES.

A. GENERAL.

FRANK P. UNDERHILL.

Isolation of 3,5-Diiodotyrosine from Iodoproteins. III. Isolation from Iodocasein. ADOLF OSWALD. Zürich. *Z. physiol. Chem.*, 74, 290–6; cf. *C. A.*, 5, 1617, 2258, 3319.—Iodocasein, containing 12.01–14.39% I, yielded about 1% of 3,5-diiodotyrosine. Only 4–5% of the I therefore was combined with tyrosine, and but 10% of the latter was iodized. A. HUNTER.

Rudolf Buchheim, his Life and his Importance in the Foundation of the Scientific Study of Medicaments and Pharmacology. O. SCHMIEDEBERG. *Arch. exp. Path. Pharm.*, 67, 1–54.—Biographical. WALTER A. JACOBS.

Iodation of Substances Derived from Proteins. HERMAN PAULY. *Z. physiol. Chem.*, 76, 291–2.—The entrance of I into protein products is only of importance in detg. the I-binding power if the I has entered the nucleus. Such compds. are colorless, when freshly prepared and do not liberate I when treated with dil. H_2SO_4. Preparing colored amorphous compds., such as iodotryptophan does not advance the problem. G. M. MEYER.

Artificial Enzymes. A. KWISDA. *Z. Oesterr. Apoth. Ver.*, 49, 537.—A brief review. A. S.

Reducing Enzymes. III. Presence of a Coenzyme of the Perhydrase in Animal Tissues. A. BACH. Geneva. *Biochem. Z.*, 38, 154–8.—When liver ext. is filtered the filtrate contains no reducing enzyme. The residue, however, has lost part of its reducing power. A coenzyme, which is essential for the reduction, goes with the soln. into the filtrate. This coenzyme can activate not only the reductase of the organs, but also that of unboiled milk. For measuring the coenzyme the organ filtrate was

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mixed with equal parts of fresh milk and 0.1 part of $NaNO_3$, which is reduced to nitrite by the reductase in the presence of coenzyme. The latter, estd. in the organs of the calf, was found richest in the liver, and in decreasing amts., in the kidneys, spleen, brain and lungs, the reducing power of lung ext. being about $^1/_3$ that of the liver. Aldehydes activate the reductase in the same manner as does the coenzyme, and it is possible that the latter, which is stable toward heat, consists of aldehydes formed by the organs. D. D. VAN SLYKE.

The Present Status of Ferment Investigation. PETER BERGELL. Berlin. *Ber. pharm. Ges.*, 21, 560–78. W. O. E.

Specific Inhibition of Rennet Action and the Existence of Different Rennet Enzymes. S. G. HEDIN. *Z. physiol. Chem.*, 74, 242–52; cf. *Ibid.*, 72, 187.—Inhibiting substances ("I. S."), similar to that of the calf stomach, are obtained by warming neutral exts. of the gastric mucous membrane of guinea pig and pike with weak NH_4OH; none are yielded by the horse, pig, sheep or rabbit. Each I. S. acts specifically, *i. e.*, only or chiefly on rennin furnished by the same species. Sp. I. S. may therefore arize apart from the immunization process. It follows also that the rennins themselves must be different. A. H.

B. METHODS AND APPARATUS.

STANLEY R. BENEDICT.

The Determination of Trypsin in Dog Feces. G. EBERLE AND L. KRALL. *Collegium*, 1911, 201–5.—Trypsin was shown to be present in dog feces by (1) Gross' test: a soda soln. of pure fat-free casein is broken down by proteolytic enzymes, giving products which remain in soln. on the addition of AcOH. Unlike (2), this method may be used at the temp. of the bates (30–40°). (2) Giessen's method: a drop of the suspected soln. is transferred to a steril gelatin plate by a Pt loop, and after a time the degree of liquefaction is compared to that produced by a standard pancreatin soln. If the antipancreatin in the blood serum of an animal treated with pancreatin is found to prevent the proteolytic action of dog feces, then trypsin is present. Pancreatin was injected into guinea pigs, and after 14 days their blood serum had no digestive action on gelatin. This serum when added to a 5% pancreatin soln. stopped its liquefying action. The same result was shown with dog feces infusions, which without the addition of the serum had a marked effect on gelatin plates.

L. BALDERSTON.

A Method for the Preparation of Nucleic Acid. AMOS W. PETERS. Harvard Med. Sch. *J. Biol. Chem.*, 10, 373–9.—The method depends upon extraction of liver tissue with hot, half satd. NaCl soln. and $Ba(OH)_2$. The $Ba(OH)_2$ is added in quantities sufficient to maintain an alk. reaction. The resulting soln. contains nucleic acid, and only minimal traces of protein. S. R. BENEDICT.

A Source of Error in the Trommer Sugar Test. FR. N. SCHULZ. Jena. *Münch. med. Wochschr.*, 59, 251–3.—In using the Trommer test S. warns against adding the $CuSO_4$ to the urin first, adding too much $CuSO_4$, too much NaOH or b. too long. He recommends the clinical use of Fehling's or Haines' soln. for with them these difficulties are avoided. H. J. CORPER.

Modification of the Reaction of Nakajama for the Detection of Bile Pigments in Urin. A. A. v. MASLOV. Kharkov. *Z. physiol. Chem.*, 74, 297–8.—The modification consists in the use of H_2O_2 in place of Fe_2Cl_6. Bile pigment is indicated by a green ppt. below a dark blue soln. A. HUNTER.

Different Methods for the Quantitative Determination of Pepsin and Trypsin with a Description of a Simple Method for the Same. WILHELM WALDSCHMIDT. Univ. Tübingen. *Arch. ges. Physiol.*, 143, 189–229.—A detailed description of all known

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methods for the detn. of pepsin and trypsin. W.'s method consists of a variation of Grützner's method (*Ibid.*, 8, 452) in which the carmin-fibrin is replaced by fibrin stained with diphenylrosaniline. Uncolored well-washed blood fibrin kept in glycerol is well washed with water free from glycerol, well pressed, cut in pieces and immersed in a soln. of 0.5 g. of the dye in 1 l. glycerol. It is so kept until ready for use. For this it is washed with water and then left for a time in 0.1% soda soln. with stirring and then pressed on a sieve and washed with soda soln. For use it is cut into small pieces. So prepared it digests much more readily than Palladin's prep. (*Ibid.*, 134, 337).
WALTER A. JACOBS.

A New Volumetric Method for Determining small Quantities of Carbohydrate. FLATOW. Köln. *Deut. Arch. klin. Med.*, 105, 58–68.—An excess of the ammoniacal $CuSO_4$ + NaOH soln. is boiled with the unknown soln. for 4 mins. in a properly protected flask. The excess of cupric ions is reduced by a standard hydroxylamine hydrochloride soln. F. C. KOCH.

The Esbach and Aufrecht Methods for the Quantitative Determination of Albumin in Urin. EMIL PFEIFFER. Wiesbaden. *Berl. klin. Wochschr.*, 49, 114–5.—The Esbach method gave extremely low results and the Aufrecht modification too high results as compared with the grav. estn. F. C. KOCH.

A New Fermentation Saccharimeter for Urin Analysis. E. WEIDENKAFF. *Oesterr. Chem. Ztg.*, 15, 7.—Among the advantages claimed are: (1) A greater stability of the app.; (2) the parts can be easily cleaned; (3) convenient reading of the % sugar, etc.
ARTHUR LEDERER.

Potassium Thiocyanate in the Saliva. RUSSELL W. BUNTING. *Dental Cosmos*, 52, 1346–50.—$FeCl_3$ cannot be considered a positive test for KCNS in the saliva in a water soln. as there are often present other substances such as diacetic acid which also react with $FeCl_3$. A new method for the detn. of KCNS is proposed, as follows: 5 cc. of saliva are slowly evapd. to dryness on a water bath. The dry residue is stirred to a thick paste after the addition of 1–2 drops of H_2O and 1–2 drops of $FeCl_3$. The paste is thoroughly stirred with 5 cc. of ether and the color of the ether soln. compared with standards. The interfering substances give the $FeCl_3$ reaction in water but not in ether (cf. following abstr.). ALFRED P. LOTHROP.

Potassium Thiocyanate versus Diacetic Acid. C. F. MACDONALD. Harvard Univ., Dental School. *Dental Cosmos*, 54, 58–9.—The color produced by diacetic acid and $FeCl_3$ is destroyed by HCl and therefore cannot interfere with the HCl-$FeCl_3$ test for KSCN even if present in saliva (cf. preceding abstract). The detn. of KSCN by extraction with ether of $Fe(SCN)_3$ from dried saliva treated with 1–2 drops of H_2O and 1–2 drops of $FeCl_3$, as advocated by Bunting, is in error, as that method will detect KSCN only if in conc. above 0.0125%, and saliva rarely contains more than 0.005% KSCN. A. P. L.

A Microchemical Method for Demonstrating the Presence of Guanine in Tissues. AMATORE DE GIACOMO. *Z. wiss. Mikroscop.*, 1910, 257–8; *J. Chem. Soc.*, 100, II, 132.—The animal tissue (after the usual prep.) is treated with a soln. of diazobenzenesulfonic acid (which has been previously tested and found sensitive to guanine); after about 10 minutes, NaOH is carefully added, when the presence of guanine is shown by a red coloration; in its absence the tissues remain pale yellow. J. J. M.

The Determination of the Age of Blood Stains. A. DE DOMINICIS. *Boll. chim. farm.*, 50, 273–6; through *Chem. Zentr.*, 1911, 2, 232.—The author's method has two parts: In the first the time required for soln. is detd. by placing a piece of stained material (5 mm. sq.) in a vessel 12 mm. wide with mark at 1 cc. and covering it with 1 cc. of pure glycerol (d. 1.23); the contents are gently rotated (about once a min.), let stand and

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the time required for complete soln. is noted. The yellow soln. is preserved well stoppered. The second stage consists in the comparison with a soln. of stains of known age, whose time of soln. is known, as to color. The identification of the blood is by spectrum analysis. In several tables the time required for soln. of stains of diff. ages under the diff. conditions is given. Stains which dissolve within a few mins. are undoubtedly fresh; the longer the time required for soln., the older the stain. F. W. SMITHER.

A Microchemical Test for Digestible Cellulose in Fecal Matters. J. AMANN. Lausanne. *Schweiz. Wochschr.*, 49, 697–700.—Neither direct microscopic exam. of feces nor chem. methods for detg. cellulose in fecal matters, *e. g.*, that of Schmidt and Strasburger, and of Simon and Lohrisch (*Z. physiol. Chem.*, 42, 55; also see *C. A.*, 5, 2531) can decide whether the cellulose residue is digestible or not. A.'s microchem. reagent is composed of: Anhydrous, pure $ZnCl_2$, 10 g.; KI, 2.5 g.; I, 0.25 g.; dist. H_2O, 10 g.; KI and I are dissolved in water, the $ZnCl_2$ is then added. To apply the test, a small particle of fecal matter, or better, some of the sediment obtained by centrifuging a suspension of comminuted fecal matter in water, is put on a slide, a drop of the reagent cautiously added and the object at once examined under the microscope. Lignified or surface-hardened cell walls and other débris of indigestible cellulose are colored yellow or brown; merely thickened cell walls remain uncolored, but digestible cellulose is stained a characteristic violet leaning more or less towards blue. This is seen, *e. g.*, in the fecal débris of cellulose from bread or boiled potatoes. Simon and Lohrisch state that bread contains 0.2–0.4%, potatoes 1.4–1.5% of cellulose. Since starch and amylobacteria, *e. g.*, *Clostridium*, *Oïdium*, etc., are turned more or less dark blue by this reagent, the latter detects and characterizes the 4 principles mentioned when they occur together. The observation should be made immediately because upon prolonged contact with the reagent, thickened cellulose will also exhibit violet coloration. In certain cases of intestinal dyspepsia where especially the small intestine seemed concerned, fecal matters appeared to consist almost entirely of débris of digestible cellulose so finely divided that they formed an amorphous detritus of non-digested but digestible cellulose with no organic structure whatsoever. This residue did not respond to Schmidt and Strasburger's fermentation test, nor to Lugol's soln. (soln. of I in KI), hence could be detected only by A.'s reagent. SIGMUND WALDBOTT.

Detection and Clinical Significance of Bile Pigments in Blood Serum. OLAF SCHEEL. Christiania. *Z. klin. Med.*, 74, 13–33.—S. employed Gilbert's quant. application of the Hayem reaction—essentially the Gmelin reaction applied to serum. In the presence of bile pigments the coag. at the juncture of the HNO_3 and serum takes on a more or less intense blue color. The quant. application consists in detg. the greatest diln. at which the serum will give the reaction. In order that the coag. at all dilns. will be of comparable depth, egg white is employed as the diluent (100 cc. egg white + 10 cc. 10% NaOH + 90 cc. H_2O containing $1\frac{1}{2}$ g. NaCl). This is preserved with camphor. The HNO_3 reagent consists of 25% HNO_3 (300 cc.) + $NaNO_2$ (0.06 g.). The reaction is noted at the end of an hr. The serum should be protected from the light. As a test for the degree of cholemia which can be more simply applied clinically than the above, S. proposes detg. the *rapidity of the appearance* of the reaction with the *undiluted* serum, *e. g.*, if the reaction appears within 30 min. a path. condition is indicated. Reactions appearing later are within the normal limits. Results with these methods are given for normal serum and for sera from various pathological cases. In general a marked cholemia is accompanied by the clinical symptoms of icterus, although there are notable exceptions. M. S. FINE.

New Method for (Reducing) Sugar Determination. FRANZ V. FILLINGER. Univ. Budapest. *Z. Nahr. Genussm.*, 22, 605–7.—The solns. required are: (I) 250 g. KCNS, 250 g. K_2CO_3 and 25 g. $KHCO_3$ per l.; (II) 4.278 g. $CuSO_4.5H_2O$ per l.; and (III) 200 g.

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KCNS, 250 g. K_2CO_3, 50 g. $KHCO_3$, and 10.42 g. $CuSO_4.5H_2O$ per l. 10 cc. soln. III = 0.01 g. dextrose. A preliminary detn. is made by adding varying amts. of sugar soln. to 10 cc. portions of III and b. 2 min. From the amt. which decolorizes 10 cc. of III the approx. sugar content of the soln. is indicated. The soln. is then dild. to about 0.1% and run from a buret into a flask containing 20 cc. each of I and II. The flask is connected to the buret by means of a stopper, through which also passes a vent connected with 2 flasks containing 5% pyrogallol and 1% NaOH soln., to exclude air. The titration is conducted at b. temp. and the end pt. shown by the decolorization of the soln. Albumin, if present, is removed by pptn. with $Fe(OH)_3$. This method was devized for the detn. of sugar in blood and gives accurate results which agree closely, when used on known amts. of pure dextrose, with those obtained by fermentation and by the methods of Pavy and Bangs. E. L. P. TREUTHARDT.

The Unification of Reducing Sugar Methods. A Correction. PERCY H. WALKER. *J. Am. Chem. Soc.*, 34, 202. In this journal, 29, 541 (*C. A.*, 1, 1779) W. gave a table for equivs. of lactose and maltose for varying amts. of Cu_2O. Error in calc. was found in the lactose table. The present paper contains the recalc. values for lactose from the reduced Cu_2O. A. H. BRYAN.

Dried Milk (BALLNER, STOCKERT). 12.

C. BACTERIOLOGY.

ERNEST D. CLARK.

Influence of the Culture Medium on the Germination of Anthrax Spores with Special Reference to Disinfection Experiments. R. J. HEWLETT AND G. N. HALL. London. *J. Hyg.*, 2, 473–80.—The usual broth medium is quite unsuitable as a test culture medium to det. the vitality of anthrax spores in disinfection expts., whereas surface agar is a very delicate medium for the purpose, even when considerable traces of the disinfectant are carried over with the inoculation. The failure of growths in broth is not due to lack of bacillary forms in the sporing material because after heating to 80° for 15 min. good growths were obtained in broth, nor was it due to lack of O since splinters of wood, after soaking in disinfectant, and floated on the surface of the broth were negative, whereas similar splinters gave good growths on agar. The authors believe that the spores are partially devitalized by the disinfectant, after which they become unable to grow on the broth. The superiority of agar over broth is not limited to the emulsified disinfectants, for similar results were obtained with phenol, and HCHO. J. H. MITCHELL.

Further Experiments on the Variability in the Gas-forming Power of Intestinal Bacteria. W. J. PENFOLD. Lister Inst. *J. Hyg.*, 2, 487–502.—In a previous paper (*Proc. Roy. Soc. Med.*, 1911, 97) P. described expts. with 3 organisms of the coli group, showing that limitation or complete abolition of the gas-forming powers could be brought about by their growth on chloroacetic acid agar, and further that in the case of *B. enteritidis* Grünthal the resistance to this medium was associated with such limitation. In the present paper it is shown that organisms of the coli group can have various gas-forming powers removed by a process of artificial selection on a special medium. Biochem. properties of the variant strains approach closely those of the naturally occurring anaerogenes-coli class. The power of gas formation from sugar (excepting isodulcite) may be lost when gas formation from alc. is retained. It is probable, therefore, that 2 different ferments are concerned. The question is raised as to the significance to be attached to the power of fermenting glucose and lactose with gas formation in the routine identification of *B. coli*. J. H. M.

Variation and Carbohydrate Metabolism of Bacilli of the Proteus Group. T. H. GLENN. Univ. Chicago. *Centr. Bakt. Parasitenk, Abt.* I, 58, 481–95.—An attempt

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to produce variation in acid production by selecting high and low acid-producing cultures of *P. vulgaris* gave negative results. Lactose is not fermented by *P. vulgaris* aerobically but is anaerobically. The acid formed in the fermentation of carbohydrate by *P. vulgaris* or *B. coli* inhibits the formation of indole. A 0.5% lactic acid conc. also inhibits this. The acidity also slightly prevents the liquefying of gelatin by *P. vulgaris*. Sugars are first attacked by the bacteria and then the proteins. The action on proteins is due to a trypsin-like enzyme in the case of *P. vulgaris*, but pepsin-like in the case of *B. cloacae*. F. C. KOCH.

The Utilization of Cellulose as a Source of Energy for the Assimilation of Atmospheric Nitrogen. III. Nitrogen Fixation. HANS PRINGSHEIM. Univ. Berlin. *Centr. Bakt. Parasitenk, Abt.* II, 23, 300.—*Clostridium americanum* does not fix atmospheric N in sterilized cellulose mixts. unless other carbohydrates like dextrose, lactose, mannitol or saccharose are present. However, in the presence of cellulose-bacteria the clostridium is able to fix the N and the latter in turn furnishes food for the development of the cellulose-bacteria. The quantity of N fixed in this way is greater than in the usual carbohydrate medium. F. C. KOCH.

Agar as a Source of Energy for the Assimilation of Atmospheric Nitrogen. H. PRINGSHEIM AND E. PRINGSHEIM. *Centr. Bakt. Parasitenk, Abt.* II, 26, 227–31.—In earlier publications (preceding abstr.) it was shown that cellulose is the principal source of energy for the activity of N-fixing bacteria. It is suggested that in sea plants, sol. substances which reduce Fehling soln. are formed by the action of *B. gelaticus* and similar organisms. These substances serve as a source of C for other bacteria which assimilate N from the air. *B. gelaticus* and *Azotobacter chroococcum* or *Clostridium americanum* cultivated together on thin agar liquefied the agar and produced a relatively large fixation of N. Agar is as good a source of C as cellulose.
M. X. SULLIVAN.

The Biological Stimulative Action of Natural Humus. TH. REMY AND G. RÖSING. Bonn-Poppelsdorf. *Centr. Bakt. Parasitenk, Abt.* II, 30, 349–84.—*Azotobacter chroococcum* when grown in Beijerinck's mannitol soln. fixes $2^1/_2$ times as much N when steril soil is added as when no other addition is made or when a steril aq. extract of the steril soil is added. This stimulating action is in part due to the Fe contained in the humus. A colloidal soln. of $Fe(OH)_3$ in saccharose or an Fe silicate acts equally as well as the steril soil. Silicate in the form of "Thomas phosphate" also stimulates the fixation of N. Only part of the Fe found necessary for the optimum conditions is taken up by the bacteria. F. C. KOCH.

Nitrogen-fixing Bacteria. VI. The Assimilation of Atmospheric Nitrogen by Thermophile Bacteria. HANS PRINGSHEIM. Univ. Berlin. *Centr. Bakt. Parasitenk, Abt.* II, 31, 23.—Nitrogen-fixing bacteria from soil require an addition of soil ext. to Winogradsky's nutrient medium in order to develop thereon. Small amts. of Na_2HPO_4 and $MgSO_4$ also were added to the medium. A fixation of 0.0059 to 0.0116 g. N was noted in 12 days. For each g. of fermented sugar an assimilation of 0.003 to 0.0062 g. N was found. F. C. K.

The Formation of Oxides of Nitrogen during Denitrification. I. Identification, Determination and Occurrence of Oxides of Nitrogen in the Fermentation Gases. SHIGEHIRO SUZUKI. Tokyo. *Centr. Bakt. Parasitenk, Abt.* II, 31, 27–49.—By mixing the gas with air or O and causing combustion by the elec. spark one can detect 5% N_2O. After the combustion starch-KI is used as an indicator. For the quant. estn. the gas must be collected over Hg. Neither pyrogallol nor P are desirable for removal of the O. S. used the pyrogallol pipet for this purpose and preferred to burn the N_2O in CO rather than in H. The following bacteria liberated varying amts. of N_2O (but

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neither NO nor NO_2) when cultures were made in various media containing KNO_3 or $Ca(NO_3)_2$: *B. stutzeri*, *B. filefaciens*, *B. fluorescens*, *B. radiobacter* and *B. denitrificans agilis*. Inoculations made with fresh earth gave off gases containing as much as 65.43% N_2O. F. C. K.

Is Iron Indispensable in the Formation of Spores of Aspergillus niger? B. SAUTON. *Compt. rend. soc. biol.*, 71, 589–90; cf. Linossier, *C. A.*, 5, 706.—From the work given where Raulin's liquid both with and without Fe was used as nutrient medium the conclusion was reached that the formation of spores is controlled by other factors besides Fe. I. K. PHELPS.

Bacteria in Meat (ZWICK, WEICHEL). 12. Meat Poisoning (MCWEENEY). 12.

D. BOTANY.

CARL L. ALSBERG.

The Tannin-Colloid Complex in the Fruit of the Persimmon, Diospyros. F. E. LLOYD. Expt. Sta., Auburn, Ala. *Biochem. Bull.* 1, 7–41; cf. *C. A.*, 6, 519.—The tannin mass in the unripe fruit has the properties of pectic substances and a definit structure consisting of a complex series of canals. This mass in the green fruit is soft, astringent and responds to the iron and alkaloid tests for free tannin. In ripening the tannin mass loses its power to swell in water, the amt. of free tannin decreasing gradually as the fruits approach maturity, but free tannin can *always* be detected although often in slight proportions. The tannin of the ripe fruit is insol., *i. e.*, united with a carbohydrate colloid from which combination it can be set free with hot, dil. mineral acids but cannot be extracted with water or alc. The colloid substance that unites with tannin to yield the insol. material seems to be a pectose or cellulose-mucilage, which increases in amt. as ripening progresses until finally enough of it occurs to combine with all the tannin and thus prevent astringency. E. D. CLARK.

Problems of Phytochemistry. H. THOMS. Dahlem. *Apoth. Ztg.*, 26, 1043–6. W. O. E.

Narcosis and Lack of Oxygen. III. The Action of Narcotics and Lack of Oxygen on Germinating Seeds. G. MANSFELD. Pharm. Inst., Univ. Budapest. *Arch. ges. Physiol.*, 143, 175–85; cf. *C. A.*, 4, 2666, 3246.—Expts. were made on the germinating seeds of *Cucurbita pepo*, very rich in fat. The extent of development was followed by measuring the fat consumption. During the first 13 days of normal germination there is a first period (98 hrs.) of no fat consumption, a second period (50 hrs.) of consumption of 37.1% fat, then a third of rest with a fat consumption of only 2.9% in 74 hrs. and finally a fourth of accelerated fat consumption of 15.7% in 96 hrs. When grown in an atmosphere of N for the 13 days only 13.4% fat was consumed as against the normal of 55.7%. When grown in the presence of ether, alc. and urethan during the first period (120 hrs.) the ether inhibited growth more than lack of O, and alc. and urethan in the same direction but less intensively. During the next 120 hrs. the narcotized seeds showed enormous acceleration so that in the third period of 120 hrs. the alc. and urethan seeds exceeded and the ether seeds almost equaled in growth that of the normal. When exposed temporarily to the action of the narcotics and lack of O during each of the periods, the rest of the time being grown in air, the influence of the former is identical with that of the latter. During the first and second periods the action is inhibitory and during the third an intense acceleration occurs so that the normal development is far exceeded. The narcotics and lack of O therefore produce identical changes in the cell structure which lead to the same effect on the activity of the cells. WALTER A. JACOBS.

The Direct Assimilation of Inorganic and Organic Forms of Nitrogen by Higher Plants. H. B. HUTCHISON AND N. H. J. MILLER. Harpenden. *Centr. Bakt. Para-*

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sitenk, Abt. II, 30, 513–47.—A good summary of the earlier work on the subject. Wheat and peas grown in water cultures directly assimilated $(NH_4)_2SO_4$ and $NaNO_3$. The wheat grew better with $NaNO_3$. Peas grow in water cultures, also readily and directly assimilated urea, acetamide, guanidine, peptone, sodium aspartate and alanine. Less readily were assimilated barbituric acid, propionitrile, ethyl nitrate, guanidine, oxamide, formanide, glycine and cyanuric acid. Hydroxylamine methyl carbonate and trimethylamine were not assimilated. In every case of sterility no nitrate was found in the cultures. F. C. KOCH.

Nature of Betaines Occurring in Plants. E. SCHULTZ AND G. TRIER. Zürich. *Z. physiol. Chem.*, 76, 258–90.—The following plants were examined and found to contain the substances noted in parentheses: *Helianthus tubersous* L., bulbs, leaves and stem (betaine $C_5H_{11}NO_2$). *Dahlia variabilis* Willdenow, bulbs and *Scorzonera hispanica* L., bulbs (trigonelline, small amts.). *Cichorium intybus* L., bulbs, leaves and stem (neither betaine nor trigonelline). *Stachys tuberifera*, leaves and stem (stachydrin). *Stachys sylvatica* L., leaves and stem (trigonelline and betonicin). *Betonica offic.* L., leaves and stem (stachydrin). *Salvia pratensis* L. (no betaine). *Vicia sativa* L. (betaine). *Pisum sativum* L. (trigonelline). Further reasons are given in support of the view that the betaines are intermediary products of plant metabolism. G. M. MEYER.

The Water Balance of Succulent Plants. D. T. MACDOUGAL AND E. S. SPALDING. *Publ. Carnegie Inst.*, 141, 77 pp. J. J. M.

Recent Accessions in Phytochemistry and Medical Botany. GEORGES RENAUDET. *Anales inst. med. nacional*, 10, 258–68. H. S. PAINE.

Disinfection of Plants. L. DANESI AND M. TOPI. *Atti accad. Lincei*, 20, I, 772–8.—The winter egg of *Phylloxera* is completely destroyed by 5 min. immersion in H_2O at 55°, by immersion in 3% K thiocarbonate and 1% black soap for 12 hrs. or by 2 hrs., exposure to 0.05% pyridine vapors. The disinfection was carried out at the beginning of April, when the egg was hatching; for disinfections in winter, the data are not yet sufficiently numerous. The same treatment is fully efficacious against radicola. Expts. with gallicola show that pyridine vapors are innocuous to the plant even after 7–8 hrs.' exposure; at a conc. of 0.05% they are lethal to larvae in the galls after 3–4 hrs. but they are not fully efficacious against the eggs. CHAS. A. ROUILLER.

E. NUTRITION.

PHILIP B. HAWK.

NORMAL.

Studies in Nutrition. V. The Utilization of the Proteins of Cottonseed. VI. The Utilization of the Proteins of Extractive-free Meat Powder; and the Origin of Fecal Nitrogen. LAFAYETTE B. MENDEL AND MORRIS S. FINE. Yale Univ. *J. Biol. Chem.*, 11, 1–3, 5–26.—Expts. on dogs show that cottonseed N is but poorly utilized, only 67–75% of the N in cottonseed flour being absorbed. The N utilization in dried meat powder is about 90%, while in fresh meat about 94% of the N is absorbed. A detailed discussion of the origin of fecal N is presented, in which are included data showing the effect of addition of non-nitrogenous, or nitrogenous, indigestible materials to const. diets. If agar and bone ash be added to a meat diet the fecal N shows an increase of 60%. When N-rich, poorly utilized substances are added to a diet the N content of the feces may simulate the value for meat feces. Hence N conc. of feces by itself is not a safe criterion by which to judge the digestibility of a material, for the N of meat feces is almost wholly of metabolic origin, while in the case of pea globulin (or other proteins which are less digestible than meat) the resulting fecal N is partly or largely due to non-digestion of the ingested protein. For differentiation of metabolic and undigested N in the feces the following plan is suggested: (1) Det. the vol.

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and N of feces resulting from the material under investigation. (2) Det. the fecal N resulting from a N-free diet to which has been added an amt. of indigestible, N-free matter, as will yield about the same vol. of feces as obtained in (1). (3) Subtract fecal N of (2) from that of (1). This excess of N is presumably due to unabsorbed N of the food. S. R. B.

Feeding Experiments with Isolated Food Substances. T. B. OSBORNE AND L. B. MENDEL. *Publ. Carnegie Inst.*, 156, 53 pp. J. J. M.

Metabolism of Development. III. Qualitative Effects of Pregnancy on the Protein Metabolism of the Dog. J. R. MURLIN. *Am. J. Physiol.*, 28, 422–54.—Decreased urea and inorganic sulfates and increased NH_3, undetd. N, neutral sulfur, etc., during pregnancy are not due, as commonly held, to a decreased power of oxidation, deamidization or dehydration on the part of the pregnant animal, but departures from the normal in the % partition of the N and S constituents of the urin can be explained as a result of protein retention by the fetus. The urea N is decreased by the large retention of protein; those fractions of the N then, which indicate the extent of the endogenous metabolism (creatinine, undetd. N, uric acid), show as a consequence a *relative* increase. J. F. L.

ABNORMAL.

Effect of Sterilization upon Animals. KIANIZIN. Odessa. *J. phys. path. gén.*, 13, 689.—Animals whose alimentary and respiratory tracts are kept steril soon die. Rabbits, dogs, rats, guinea pigs, pigeons, and chickens were used. Death is not due to starvation since the wt. of the steril animals is always greater than controls dying of starvation with normal intestinal and oral flora. The ratio (N urea/N total) is below normal in the steril animals, showing a deficient oxidation. Leucomaines in the urin increase as a result of this lessened oxidation. The presence of bacteria seems necessary to stimulate this factor in metabolism. H. C. BRADLEY.

Curves for Protein Assimilation with Reference to the Digestive Function of the Stomach. HEINRICH BENEDICT AND NIKOLAUS RÓTH. Univ. Budapest. *Z. klin. Med.*, 74, 74–91.—The hourly excretion of N for 8 hrs. was detd. in patients with normal and pathogenic digestive tracts. The food, consisting of $^1/_2$ l. milk, 100 g. lean ham, and 2 eggs, contained 52.85 g. protein. Normally a max. elimination was attained in 3–4 hrs., the original level being reached in 6–7 hrs. In cases of hyperacidity, a max. was reached a little later (in the 4th hr.). In cases of anacidity, no increase of protein metabolism took place in the 1st 8 hrs., the curve following a more or less level course. The greater the disturbance in motility, the slower was the max. attained. M. S. F.

Metabolism Investigations with Experimental Salt Fever. H. FREUND AND E. GRAFE. Heidelberg. *Arch. exp. Path. Pharm.*, 67, 55–71.—The study of the respiratory interchange and of the protein metabolism in rabbits after injection of isotonic solns. (NaCl, Ringer, sugar, adrenaline) showed that the consequent fever resembled infectious fever in the increased heat production and increased N metabolism. The increase of oxidation following NaCl injections was about 8%, with Ringer's soln. about 23% and with sugar soln. 28%. All of these are minimum values. NaCl fever with its relatively simple mechanism is exceptionally well suited for the study of fever pathology. WALTER A. JACOBS.

Chemical Studies on Intestinal Infantilism. I. Endogenous Metabolism, Creatinine, Creatine and Uric Acid. FRANCIS H. MCCRUDDEN. New York. *J. Exp. Med.*, 15, 107–12.—In 3 cases of intestinal infantilism, the creatinine excretion was more irregular than normally, and the creatinine coeff. was low. Creatine was found in the urin on a creatine-free diet. The sum of creatinine and creatine was also not

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constant. The endogenous uric acid was irregular from day to day. The creatine excretion is apparently lower on a high fat diet than on a high carbohydrate diet. **II. The Relation of Endogenous to Exogenous Metabolism: Nitrogen and Sulfur Distribution, and Calorimeter Experiments.** F. H. McCRUDDEN AND H. L. FALES. New York. *J. Exp. Med.*, 15, 113–18.—In 3 cases of intestinal infantilism, the excretion of N in the urin per sq. m. of body surface was low. Heat radiation was normal. In spite of the fact that the abs. quantity of N was low, the distribution of N and S among the N- and S-containing constituents of the urin was in normal ratio. NH_3 excretion was normal. Ethereal sulfates were slightly increased. The respiratory coeff. showed that the glycogen supply had not been used up after 18 hrs.' starvation.
W. A. J.

The Control of Pancreatic Diabetes in Pregnancy by the Passage of the Internal Secretion of the Pancreas of the Fetus to the Blood of the Mother. A. J. CARLSON AND F. M. DRENNAN. Univ. Chicago. *Am. J. Physiol.*, 28, 391–5.—Pregnant bitches on which pancreatectomy was preformed did not develop the typical pancreatic diabetes of normal pancreatomized dogs, the results depending on the period in the pregnancy at the time of operation. A pregnant bitch operated on at nearly full term did not show diabetes for 5 days. The pups were then removed by Cesarean section when typical diabetes of pancreatectomy appeared. It seems that the internal secretion of the pancreas of the fetus during the latter period of gestation is sufficient to act as a residual pancreas for the mother and control sugar metabolism. J. F. LYMAN.

Carbohydrate Metabolism and Glucosuria. F. W. PAVY AND W. GODDEN. Univ. London. *J. Physiol.*, 43, 199–208.—Dextrose injected intravenously may cause glucosuria in rabbits, the severity of the condition depending on the rate at which the injection is made. If the injection is slow, 1 g. per kg. in 15 min., no glucosuria is noticed. The capacity of the organism to unite with dextrose and cause it to disappear from view is associated with the incorporating power of bioplasm; dextrose not so combined is discharged from the system. J. F. L.

Metabolism in Diabetes Mellitus. F. G. BENEDICT AND E. P. JOSLIN. *Publ. Carnegie Inst.*, 136, 234 pp. J. J. M.

The Physiology of the Thyroid Glands. I. The Cause of Increased Nitrogen Excretion Following Lack of Oxygen. G. MANSFIELD AND FRIEDRICH MÜLLER. Univ. Budapest. *Arch. ges. Physiol.*, 143, 157–74.—Normal animals in which lack of O was produced by HCN, air diln. and bleeding always reacted with an increased protein decomp. as evidenced by an increased N elimination. This reached the maximum on the second day reverting to normal on the third or fourth. Animals from which the thyroids had been removed failed to react. The authors consider the increased protein decomp. following lack of O to be connected with the function of the thyroids. It was proved that asphyxia of the thyroids themselves caused an increase of N elimination similar to that produced by depriving the whole organism of O. W. A. J.

A Contribution to the Study of Protein Metabolism under "Atoxyl." FRANCIS D. BOYD. Edinburgh. *Arch. intern. pharmacodyn.*, 21, 281–5.—As, administered as atoxyl in therapeutic doses, has a definit retarding influence upon protein metabolism and under its influence tissue N is retained. P. J. HANZLIK.

F. PHYSIOLOGY.

ANDREW HUNTER.

The Nature and Significance of the Calcium Content of the Blood. ALBERT G. NICHOLLS. *Trans. Roy. Soc. Can.*, [3] 4, (*Sect. 4*), 85–94 (1910).—A general résumé.
A. T. CAMERON.

Researches on the Cerebrosides of the Brain. HERMANN LOENING AND H. THIER-

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FELDER. Tübingen. *Z. physiol. Chem.*, 74, 282–9.—Protagon is heated 1–2 hrs. on a water bath with satd. soln. $Ba(OH)_2$. Phosphatides are thus completely destroyed, while cerebrosides are not affected. The ppt. is boiled repeatedly with fresh portions of acetone, from which the cerebrosides sep. on cooling. Yield, after 9 extns. during 28 hrs., 32% of the protagon. On fractional crystn. from abs. alc. according to Thudichum the mixt. yielded cerebrone, and 2 substances (m. 176–7° and 173–4°, resp.) having the general characters of kerasin. A. HUNTER.

The Pressor Bases of the Urin. WILLIAM BAIN. King's College. *Lancet*, 89, I, 1409–11.—These bases (probably isoamylamine and *p*-hydroxyphenylethylamine) are extracted from charcoal which has been well shaken with the urin to be examined. The bases are absent from the urin of children 10–12 yrs. old. After 14 yrs. of age he bases are usually found in such amts. that the conc. from $^2/_3$ l. urin when injected intravenously causes a distinct rise in blood pressure in cats. A vegetable diet (fish and eggs also to a less degree) reduces the quantity of pressor substance slightly from the amt. normally present on a mixed diet. In gouty persons with normal blood pressure the pressor bases are excreted in normal amts. In cases of high blood pressure the urin contains very little or no pressor substance, probably because the high blood pressure itself is due to retained pressor substances. F. C. KOCH.

The Presence of the Internal Secretion of the Pancreas in the Blood. F. M. DRENNAN. Univ. Chicago. *Am. J. Physiol.*, 28, 396–402.—Fresh defibrinated blood injected intravenously into pancreatectomized dogs lowered the sugar output in the urin and the D:N ratio; salt soln. Stale blood, and blood from pancreatectomized dogs, had no effect on the sugar metabolism, hence the action must be due to an internal secretion in the blood which is such an unstable compd. that it is very easily destroyed, defibrinated steril blood losing its activity in 2 hrs. J. F. L.

The Chemical Composition of the Nervous System. N. A. BARBIERI. *7th Intern. Congr. Appl. Chem.*, 1909 (*Sect. IV, A. 2*), 63–5; *J. Chem. Soc.*, 100, II, 413. J. J. M.

The Relationship of Kidney Function and the Glycogen of the Liver. HERMANN F. GRÜNWALD. *Arch. exp. Path. Pharm.*, 64, 147–60; *J. Chem. Soc.*, 100, II, 129. J. J. M.

Physiological Variations in the Refraction and Viscosity of Infant Blood. EMERICH RUSZ. Budapest. *Monatschr. Kinderheilk.*, 10, 361; through *Jahrb. Kinderheilk.*, 75, 93. M. S. F.

Coloring Matter of the Blood. E. LETSCHE. Univ. Tübingen. *Z. physiol. Chem.*, 76, 243–57.—A redetn. of the absorption constant $A = c/e$ for horse oxyhemoglobin with the Hüfner spectrophotometer gave values for A of the same magnitude as those detd. last by Hüfner for ox oxyhemoglobin. This necessitated a correction of the calc. concs. of the hemoglobin solns. previously used by L. to det. the CO absorption per g. hemoglobin. The corrected values for solns. rendered O-free by vacuum and displacement by H gave (av.) 1.36 cc. CO, agreeing with that of Butterfield; solns. reduced with $(NH_2)_2H_2O$ gave 1.09 cc. CO per g. hemoglobin. The av. of 5 detns. of the Fe content of horse oxyhemoglobin = 0.364% (Tinnoffsky found 0.335%). From this the mol. wt. of oxyhemoglobin is 15,400. G. M. MEYER.

Further Observations on Chymosin and Pepsin of the Calf's Gastric Juice. A. RAKOCZY. Physiol. chem. Lab., kais. St. Vladimir Univ., Kiev. *Z. physiol. Chem.*, 73, 453–8; cf. *C. A.*, 5, 1935.—By means of a "small stomach" gastric juice was obtained from 2 calves, A and B, 5 and 1.5 months old resp., A being upon a hay ration and B on milk. The juices, brought to the same acidity, had practically identical digestive powers, but A coagulated milk 3 times less rapidly than B. In the first 5 months

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of life the rennin content of the calf stomach diminishes considerably, while the pepsin remains unchanged. Milk feeding of A for 2–3 days did not alter the properties of its secretion. A. HUNTER.

G. PATHOLOGY.

H. GIDEON WELLS.

A Sulfur Reaction in the Urin of Cancer Cases. HUGO SALOMON AND PAUL SAXL. Vienna. *Deut. med. Wochschr.*, 38, 53–5.—The abnormal constituent in the urin of carcinomatous patients is a netural S constituent whose S can be spilt off by means of H_2O_2 and can then be detd. as $BaSO_4$; positive urins yield 0.010–0.018 g. $BaSO_4$ from this form for 100 cc. (antipyrine and creosote medication interfere with the test). Of 41 carcinoma cases, 30 were positive, 4 faintly positive, 1 questionable and 6 negative. Of 182 normal urins, 6 were positive, 3 faintly positive, 1 questionable and 172 negative. H. J. CORPER.

Wassermann Reaction and Lead Intoxication. ROBERT HILGERMANN. Königl. Koblenz. *Deut. med. Wochschr.*, 38, 118–9.—In 35 cases of Pb poisoning H. obtained no positive Wassermann reactions, thus not corroborating Dreyer and Schnitter's findings. H. J. C.

The Change in the Antitryptic Titer of the Serum in Anaphylaxis. STEPHAN RUSZNYAK. Univ. Budapest. *Deut. med. Wochschr.*, 38, 168–9.—The antitryptic titer of the serum of anaphylactic guinea pigs (using egg white as sensitizing protein) is doubled in $^1/_4$–$^1/_2$ hr. after giving the intoxicating dose, from which R. concludes that anaphylaxis is called forth by protein decomp. products formed by rapid parenteral fermentation (peptone intoxication), this fermentation resembling trypsin action, and that at the beginning of the antianaphylactic state large amts. of these cleavage products are present in the blood serum which tend to inhibit the fermentation of a newly introduced portion of protein. H. J. C.

A Method for Injecting Large Amounts of Foreign Serum into Sensitive Individuals. E. FRIEDBERGER AND S. MITA. *Deut. med. Wochschr.*, 38, 204–7.—Sensitized guinea pigs tolerated many times the intoxicating dose intravenously when this was injected slowly into the blood stream. For slow intravenous injection the authors used a special app. constructed by Gröber. H. J. C.

The Serodiagnosis of Tumors by Complement Fixation. E. V. DUNGERN. Heidelberg. *Münch. med. Wochschr.*, 59, 65–7.—Using beef blood and guinea-pig complement and exts. of mammary or pharyngeal carcinoma or vulvar epithelioma as antigen, D. obtained positive findings in all of 121 patients. 22 healthy controls were negative. Doubtful findings were only obtained in syphilitics with positive Wassermann. H. J. C.

The Role of Hypersensitiveness in Infection and Immunity. III. ALFRED SCHITTENHELM AND WOLFGANG WEICHARDT. Univ. Erlangen. *Münch. med. Wochschr.*, 59, 67–9.—The digestion of proteins is associated with the formation of intermediate digestion products, part of which are toxic and part non-toxic (the diamino combinations being apparently more active than the monoamino). Casein when intravenously injected (guinea pigs) was non-toxic as was also casein peptone, while casein kyrine sulfate was toxic. Silk peptone and horse-hair peptone were non-toxic. Clupeine sulfate and histone were toxic, while artificial nucleohistone and native nucleohistone were not. Glutokyrine β-sulfate, a lower cleavage product, was non-toxic, while β-imidazolylethylamine was toxic. H. J. C.

Is Birth an Anaphylactic Phenomenon? P. ESCH. Marburg. *Münch. med. Wochschr.*, 59, 69–72.—A hypersusceptibility of the gravid woman for fetal serum or

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placental extract is not demonstrable by the intracutaneous reaction method of Römer. This speaks against the possibility of birth being an anaphylactic phenomenon. H. J. C.

The Nitrogen-containing Colloid of the Urin. HUGO PRIBAM AND JULIUS LÖWY. Med. Univ., klinik d. Hofrates O. S. R. *Münch. med. Wochschr.*, 59, 239–42.—Increase in colloid N in the urin is not diagnostic of malignant tumor, as it may occur in secretion disturbances of the digestive organs. Liver and kidney disease may increase the colloid N content, as may also fever-producing diseases, diseases associated with disturbance of internal secretions (Morbus Basedowii, Adipositas cerebrogenitales) and diabetes insipidus and mellitus. H. J. C.

Clinical Study of Tetany with Special Reference to the Vegetative Nervous System. W. FALTA AND FR. KAHN. Wien. *Z. klin. Med.*, 74, 108–77.—Symptoms of tetany are due mainly to increased irritability or increased stimulation of the nervous system. The seat of the increased irritability is the ganglion cell. Symptoms of hyperthyroidism and disturbances of intermediary protein metabolism are found (increased NH_3 and peptide N). The role of the parathyroids is discussed. M. S. F.

Lymphoid Transformation of the Liver in Trypanosomiasis and Leishmaniosis. AUGUSTE PETTIT. *Arch. intern. pharmacodyn.*, 21, 163–88. P. J. HANZLIK.

Immunity to Adrenaline. N. WATERMAN. Rotterdam. *Z. physiol. Chem.*, 74, 273–81; cf. *C. A.*, 4, 1624.—A series of rabbits was injected with increasing doses (10–45 mg.) of *dl*-suprarenine; before and after treatment it was detd. what increase of blood sugar conc. was produced by 0.5 mg. *l*-suprarenine. The previous results of W. and of Pollak (*C. A.*, 5, 1608) were confirmed; but in some animals the second dose of *l*-compd. produced a much smaller rise of blood sugar than the 1st; *e. g.*, 0.203 and 0.275 as against 0.357 and 0.435%, resp. It is concluded that besides the lowered susceptibility (apparent immunity) of P., there may also be attained an increased resistance (real immunity) towards adrenaline. A. HUNTER.

Production of Passive Hypersensitiveness to Tuberculin. CHARLES R. AUSTRIAN. Baltimore. *J. Exp. Med.*, 15, 149–62.—Expts. made with the blood of a patient gave conclusive proof that hypersensitiveness to tuberculin can be transferred from man to the guinea pig, also that tuberculin hypersensitiveness in man is a condition of true anaphylaxis and that in cases of tuberculin "idiosyncrasy" at least "sensibilisin" may be present in the circulating blood. WALTER A. JACOBS.

Alimentary Hyperglucemia. HERMANN TACHAU. Frankfurt a/M. *Deut. Arch. klin. Med.*, 104, 437–47.—One hr. after taking 100 g. dextrose there is no perceptible rise in blood sugar in the healthy individual nor in cases of chronic nephritis. In cases of diabetes mellitus, in severe cases of icterus catarrhalis, icterus lueticus and in alimentary glucosuria the reverse is true. In most of the cases of hyperglucemia no glucosuria was found. F. C. KOCH.

Studies on Renal Diabetes. HERMANN TACHAU. Frankfurt a/M. *Deut. Arch. klin. Med.*, 104, 448–54.—The sugar content of blood was 0.086%, no matter whether the individual was well nourished or not. Even 1 hr. after taking 100 g. dextrose the amt. of sugar in the blood remained the same; the urinary glucose here also changed but very little. F. C. KOCH.

The Relation of Albuminuria to Acidity of the Urin and the Effect of Alkali Administration on the Acidity, Albuminuria, Diuresis, Chloride Excretion and Urinary Ammonia. RUDOLF V. HOSSLIN. Munich. *Deut. Arch. klin. Med.*, 105, 147–71.—High acidity and high NH_3 content of the urin usually go hand in hand with the presence of albumin and casts therein. With doses of 9–15 g. $NaHCO_3$ the relations were reversed and the chloride excretion increased. Some cases of nephritis and albumin-

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uria are not benefitted by $NaHCO_3$. Where the $NaHCO_3$ treatment is beneficial, the discontinuation thereof brings about a return of the pathological condition.
F. C. KOCH.

Hepatic Alterations Following Repeated Injections of Organic Liquids. A. GOUGET AND D. THIBAUT. *Arch. méd. exp.*, 23, 635–42.—The livers of rabbits injected with blood serum for several months showed extreme congestion, and in some cases hemorrhage. There was little or no change in the connective tissue. The kidneys and spleen remained normal. Ascitic fluid was less toxic than blood serum, whereas edematous fluid and normal NaCl soln. were without effect. J. H. MITCHELL.

Alimentary Anaphylaxis with Milk. G. LAROCHE, C. RICHET AND FR. SAINT-GIRONS. *Arch. méd. exp.*, 23, 643–59.—Both raw and boiled milk of the cow, when fed exclusively to guinea pigs, were found to be toxic, as shown by the loss in wt. and death. After 5 days of such feeding the pigs became sensitized to injections of milk.
J. H. MITCHELL.

Calcium in the Blood of the Aged. G. ÉTIENNE AND H. ROBERT. *Arch. méd. exp.*, 23, 666–72.—The av. amt. of CaO in the blood of old age was found to be 0.046 pt. per mille, with 0.038 and 0.052 as the extremes. There was no marked difference in the amts. for adults and for old age. The Ca content plays no role in the formation of atheroma of the vessels. J. H. MITCHELL.

Note on Acid-resisting Bacilli Cultivated in Special Media. M. POTET, Médecin-major. *Arch. méd. exp.*, 23, 660–5.—Unsuccessful attempts were made to immunize animals against *B. tuberculosis* by injecting the products of acid-resisting bacilli grown on special media (bile, glucose, carbonate). J. H. MITCHELL.

Pathogenesis of Hereditary Hemophilia. T. ADDIS. Edinburgh. *J. Path. Bact.*, 15, 427–52.—Fibrinogen is present in normal amts. in hemophilic blood, and is as readily coagulated by thrombin as normal fibrinogen. The amts. of thrombin developed in the complete coagulation of equal pts. of hemophilic and normal blood are equal. Hemophilic thrombin is as active in coagulating fibrinogen as is normal thrombin, but the rate of formation is slower than normal, and proportional to the rate of the hemophilic blood, which is directly dependent upon the formation of thrombin. There is no appreciable difference in the antithrombin content of hemophilic blood. There is no substance in hemophilic blood, not present in normal blood, which hinders the formation of thrombin. There is no appreciable diminution in the Ca content. Hemophilic thrombokinase, derived either from the formed elements of the blood, or from the tissue cells, is as abundant and as active as in normal blood. Prothrombin is present in normal amts., but there is a defect in it as is shown by the delayed formation in the presence of thrombokinase and Ca. This qualitative defect in the prothrombin is the cause of the delay in the coagulation of the blood in hemophilics. J. H. M.

Positive and Negative Phases of the Coagulation of Blood in Man. D. A. WALSH. Univ. Sydney. *J. Path. Bact.*, 15, 467–74.—The phenomena of positive and negative phases of coagulation of the blood may be reproduced in certain diseases in man, such as are associated with an abnormal increase and disintegration of leucocytes in the blood and tissues, giving rise to thrombokinase in excess. White fibrin thrombi in the heart and pulmonary artery (not due to local lesions or embolism) are formed only when the blood is in active motion, and represent the positive phase. These thrombi are analogous to the coagulation induced by intravenous injection of nucleoprotein (thrombokinase) *in vivo*, and to the clots formed by whipping blood. They are probably a cause of death, rather than a result of dying. J. H. MITCHELL.

Infective Methemoglobinemia in Rats Caused by Gaertner's Bacillus. A. E. BOYCOTT. London. *J. Hyg.*, 11, 443–72.—A spontaneous occurrence of Gaertner

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infection among rats was found associated with methemoglobinemia, and in some cases anemia. Strains of the bacillus isolated from these rats reproduced the same condition in fresh rats, but not in rabbits, guinea pigs nor mice. Other strains of the organisms isolated from rats, guinea pigs and human sources had a similar effect.

J. H. MITCHELL.

Serum Reactions (Complement Fixation) of the Meningococcus and the Gonococcus. J. A. ARKWRIGHT. Lister Inst. *J. Hyg.*, 11, 515.—Meningococcal sera produce complement fixation as readily with some gonococcal exts. as with exts. of some strains of the meningococcus, whereas no reaction is obtained with some heterologous meningococcus exts. A monovalent serum usually reacted better with an ext. of its homologous coccus than with exts. of other strains of meningococcus or gonococcus, but a gonococcal ext. sometimes gives a better reaction with a meningococcal serum than the homologous ext. does. Gonococcal sera and exts. are usually more potent in complement fixation than those prepared from meningococci. No satisfactory distinction can be made between meningococcus and gonococcus by the complement fixation.

J. H. MITCHELL.

Histology of the Kidney in Hemoglobinuria. H. RIBBERT. Bonn. *Centr. allgem. Path.*, 23, 62–3.—Takes exception to the recent statement of Miller that the hemoglobin (hb) is excreted through the convoluted tubules. R. cites expts. of his own which indicate that the hb. escapes through the glomerules. When hb. and carmin are injected into a renal artery the former is found immediately afterward in the glomerules, while the convoluted tubules secrete the carmin.

H. G. W.

Paroxysmal Hemoglobinuria. W. L. Moss. Johns Hopkins Univ., Baltimore. *Folia serol.*, 8, 1117–42.—The serum of patients with paroxysmal hemoglobinuria contains a complex hemolysin of amboceptor-complement type, which dissolves the corpuscles not only of the patient but also of others with paroxysmal hemoglobinuria, and apparently of all other individuals. This serum may possess also normal isohemolysin as well as that characteristic of the disease. It is possible to adsorb and remove from the serum separately either the autoamboceptor or the isoamboceptor. Only the amboceptor is specific in paroxysmal hemoglobinuria, the complement seeming not to differ from that in normal serum. This amboceptor is characterized by being able to unite with corpuscles only in the cold and in the presence of complement, and also by its ability to hemolyze corpuscles of groups not hemolyzed by the patient's normal isohemolysins. Hemolysis by this hemolysin also differs from normal isohemolysis in occurring independent of agglutination. The corpuscles of 3 cases studied showed variable but increased resistance to hypotonic NaCl soln.; the serum of all gave positive Wassermann reactions, and salvarsan seemed helpful in the one case in which it was used.

H. G. W.

Complement Fixation in Human Carcinoma. J. O. W. BARRATT. Univ. Liverpool. *Z. Krebsforsch.*, 11, 245–58.—Tests made with serum of 6 cancer patients, using as antigen in each case an ext. of the corresponding tumor. In 2 cases the hemolysis was less than with normal serum; in the rest the resulting reaction did not differ greatly from that with normal serum.

H. G. W.

Anaphylaxis. XXVII. Iodine Sensitization of Guinea Pigs. E. FRIEDBERGER AND T. ITO. Univ. Berlin. *Z. Immunität.*, 12, 241–67.—Sensitization with proteins treated (but not completely satd.) with I rendered guinea pigs sensitive to the same iodized protein, but not to iodized proteins derived from some other species. Also such sensitized pigs reacted more strongly to injections of NaI, CHI_3, and I-KI soln. Injection of guinea pigs with Lugol's soln. (I-KI) rendered them sensitive to iodized

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guinea-pig serum, but not to NaI or Lugol's soln. Animals reacting to a 2nd injection of a homologous iodized serum are refractory to a 3rd dose of the same serum.
H. G. W.

Coagulability of Blood in Anaphylaxis. N. N. SIRENSKII. St. Petersburg. *Z. Immunität.*, 12, 328–32.—Coagulation delayed, most during height of reaction just before death, or in blood taken after respiration had ceased but while the heart was still beating. The Ca and Mg content of the blood is not altered, but the fibrin ferment is decreased, and apparently also the fibrinogen. H. G. W.

Acid Agglutination of Bacteria. M. BENIASCH. Berlin. *Z. Immunität.*, 12, 268–315.—Corroborates the work of Michaelis and gives a full review of his methods and expts. Neither the acid as such, nor the anion, is responsible for the agglutination, but only the H ions. This acid agglutination is produced only by ion. conc. within certain definit limits, characteristic for each species of bacteria. There is also an optimum conc. constant for each species, and different for every separate species. Apparently acid agglutination of bacteria belongs to the same class of reactions as the coagulation of amphoteric colloids of preponderatingly negative character, especially such colloids as the proteins, by H ions. This method can be applied for the differentiation of certain bacteria, but it is especially useful with the colon group of bacteria; here it will distinguish not only the different members of the group, but also the various subdivisions of one variety. The acid agglutination test deserves to take rank with the other biological and morphological characteristics commonly used in the characterization and differentiation of bacteria. H. G. W.

Hemoglobinemia. J. O. W. BARRATT AND W. YORKE. Univ. Liverpool. *Z. Immunität.*, 12, 333–52.—The general symptoms which follow hemoglobinemia in rabbits produced by injection of (1) hemolyzed erythrocytes, (2) hemoglobin freed from stroma, (3) stroma as free as possible from hemoglobin, are to be ascribed to the effects of substances derived from the stroma. Complement and amboceptor are not much altered, but the coagulability of the blood is usually decreased. Anuria, which frequently accompanies hemoglobinemia, seems to depend chiefly upon the free hemoglobin and not upon the stroma. H. G. W.

Studies in Experimental Glucosuria. VII. The Amount of Glycogenase in the Liver and in the Blood Issuing from it, as Affected by Stimulation of the Great Splanchnic Nerve. J. J. MACLEOD AND R. G. PEARCE. Western Reserve Univ. *Am. J. Physiol.*, 403–21.—Stimulation of the great splanchnic nerve in the dog did not increase the glycogenolytic activity of the liver tissue as measured by a variety of methods, nor of the blood issuing from the liver. It did increase the reducing power of the vena cava blood. It is concluded that glycogenolytic activity in the liver depends not on varying amts. of the enzymes, but on varying conditions within the cells in which the changes are exhibited. J. F. LYMAN.

H. PHARMACOLOGY.

ALFRED N. RICHARDS.

Vanadium Poisoning. G. E. LEES. *Eng. Mining J.*, 92, 99–100; through *J. Soc. Chem. Ind.*, 30, 977.—After 5 yrs.' experience in the treatment of V ores and in the entire absence of evidence L. concludes that there is no such disease as "vanadiumism." E. J. C.

The Treatment of Laryngeal Tuberculosis and other Local Infectious Processes with Sodium Iodide and Ozone or Hydrogen Peroxide. S. A. PFANNENSTILL. Malmo. *Deut. med. Wochschr.*, 37, 2420–3.—Nine out of 14 cases of laryngeal tuberculosis were successfully treated by the internal administration of iodides (NaI), followed subsequently by the inhalation of O_3 for 2–4 hrs. Some non-tubercular infections were also treated successfully by this method. H. J. CORPER.

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The Action of Atophan in Chronic Gout. A. PLEHN. Berlin. *Deut. med. Wochschr.*, 38, 102–7.—The diagnosis of gout cannot be made alone from the increase of uric acid in the blood. Atophan (phenylquinolinecarboxylic acid) doubles the uric acid excretion in most chronic gouty individuals, and this increased excretion lasts longer in gouty than in normal people. The action upon the local inflammatory conditions is usually excellent. Accidents have never been observed by P.

H. J. CORPER.

Salvarsan and Fever. GUSTAV STÜMPKE. Hanover-Linden. *Deut. med. Wochschr.*, 38, 159–62.—Intravenous injection of unquestionable aqua distillata caused no rise in temp. in luetics while the same water containing salvarsan did. Second and later salvarsan injections were not so prone to cause a rise in temp. Intravenous injection of steril salt soln. in 250 cc. amts. also caused a rise in temp. in luetics.

H. J. CORPER.

Duration of Arsenic in the Animal Organism after Intravenous Injection of Salvarsan. HANS RITTER. Univ. Kiel. *Deut. med. Wochschr.*, 38, 162–3.—Using the Naumann method for the detn. of As in tissues qualitatively, R. found that in rabbits after a single injection of salvarsan, As was present in the liver for 30 days, in the kidney, brain and spleen for 10 days. After a double injection (interval of 10 days) As was present in the liver for 50 days, in the kidney for 40 days, and not present in the brain and spleen after 30 days. If the second injection was given after 8 days' interval As was present for 70 days, 50 days and 40 days, resp. If 3 injections were given the liver contained As for 80 days, the kidney and brain for 60 days. H. J. CORPER.

Salvarsan in the Blood after Intravenous Injection. J. ABELIN. Univ. Bern. *Münch. med. Wochschr.*, 59, 81.—Using the same test for salvarsan in the blood that he had previously used for its presence in the urin (*C. A.*, 5, 3289) A. found in 8 tests on patients that salvarsan as such was still present after 1½ hrs., gradually diminishing in amt. A test made after 2¼ hrs. was negative. H. J. CORPER.

Acute Benzine Poisoning in the Suckling. ADOLPH FRIEDIGER. Munich. *Münch. med. Wochschr.*, 59, 252–3.—Friediger reports a case of typical benzine poisoning by inhalation occurring in a suckling 6 weeks old. H. J. CORPER.

Spirometric Investigation on the Pathology and Pharmacology of Respiration of Children. R. LEDERER AND HANS VOGT. Strassburg. *Jahrb. Kinderheilk.*, 75, 1–17.—Nineteen expts. on 7 children receiving various doses of alc. (5%) are recorded. No important influence upon the frequency of respiration was found, but in more than half the cases the depth of respiration was increased. The spirometric method was employed to compare normal children with those with various pulmonary disorders.

M. S. F.

Investigations on the Influence of Sodium Benzoate upon Artificially Nourished Infants. CL. A. GRUBE AND W. H. BUHLIG. *Arch. of Ped.*, 28, 849; through *Jahrb. Kinderheilk.*, 75, 95.—Infants receiving 0.15–0.3 g. Na benzoate daily for weeks or months showed no symptoms which could be referred to this medication.

M. S. F.

The Action of Heated and Unheated Endotoxins of Typhoid and Cholera on the Isolated Mammalian Heart. CESARE PEZZI AND EMILE SAVINI. Paris. *Arch. intern. pharmacodyn.*, 21, 189-202.—The expts. were conducted with the Pachon perfusion app. Certain precautions in conducting such expts. are given. The endotoxins of cholera and typhoid exert a true toxication on the isolated rabbit heart, but if the same endotoxins are heated to 120° for 30 min. they are rendered inactive. Relatively conc. solns. are necessary to obtain these results. P. J. HANZLIK.

Bromural, its Distribution and Decomposition in the Animal Organism. S.

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TAKEDA. Univ. Kyoto. *Arch. intern. pharmacodyn.*, 21, 203–11.—Bromural acts as a hypnotic. The intensity of its action depends upon the quantity of the undecomposed mol. in the brain. If the Br content of the brain of a rabbit of 10 g. reaches 0.0083 g. then the animal goes to sleep; if it reaches 0.0223 g., it becomes intoxicated. The rabbit brain does not readily decompose bromural. Upon this rests its comparatively long action. If large quantities are present in the body the liver, as well as other tissues, aid in the decomp. For this reason bromural may be considered a safe hypnotic and it is also free from after-effects. P. J. HANZLIK.

The Action of Mucilaginous Adjuvants in Lumber Anesthesia. E. ERHARDT. Univ. München. *Arch. intern. pharmacodyn.*, 21, 213–25.—Without the addition of a gum (acacia) to the injection of a 1% tropococaine soln. a paralysis of the respiration always occurs. The addition of 15% acacia does not lead to respiratory paralysis, but only to disturbances of the respiration. The paralysis of the lower extremities was shorter than the anesthesia, while without acacia the paralysis was longer, the anesthesia being longer with higher concs. of acacia. P. J. HANZLIK.

Application of the Arabinic Salts of the Cocaine Series to Lumbar Anesthesia. E. ERHARDT. Pharmakol. Inst. Univ. München. *Arch. intern. pharmacodyn.*, 21, 237–42.—The arabinates of cocaine produce fewer toxic symptoms than the chlorides. The arabinate anesthesia lasts 2 to 4 times longer than that due to chlorides. The mucilaginous elements of the arabinates render the anesthetizing bases less irritant, and a higher grade of anesthesia can be produced than with the chlorides.
P. J. HANZLIK.

The Action of the Halogen Salts of Sodium on the Smooth Muscle of Blood Vessels and of the Uterus. LUCY PROCHNOW. Univ. München. *Arch. intern. pharmacodyn.*, 21, 287–312.—The action on the smooth muscle of the blood vessels of warm-blooded animals is summarized as follows: Na halides increase the irritability and tonus; F salts act strongest, then those of I, then Br; the action is a specific one for these ions; they attack the same organ elements as atropine, but possess an antagonistic action. The action on the smooth muscle of the uterus is exactly the same as that on the vessels. Br and I affect the tone but little, with no action on the rhythmic contractions. F increases the tonus and the frequency of rhythmical contractions, producing finally a tetanic contraction. The point of attack of the halides lies in the uterus itself, in its contractil or nervous elements. P. J. HANZLIK.

The Action of Caffeine on the Mammalian Circulation. J. D. PILCHER. Cleveland. *Clev. Med. J.*, 11, 35–40.—Following a rapid intravenous injection of caffeine there is an abrupt fall in blood pressure. This does not occur with other methods of administration. Small doses of caffeine produce an increase in cardiac tone and there is vascular relaxation—peripheral in origin, for the vasomotor center itself is stimulated—and usually a rise in blood pressure. The end result is a greater mass movement of blood. Larger doses result in a decrease of cardiac tone and further vascular relaxation. Successive doses lead to acute cardiac dilatation and death.
P. J. HANZLIK.

The Action of Choline (Choline Hydrochloride) on the Blood Pressure. EMIL ABDERHALDEN AND FRANZ MÜLLER. Berlin. *Z. physiol. Chem.*, 74, 253–72; cf. *C. A.*, 5, 1620.—In a new series of expts. on cats and dogs it is shown that the action of choline on blood pressure is greatly affected by the dose, the narcotic agent employed, and other minor circumstances. The presence of impurities cannot be inferred from the blood-pressure curve alone. The typical effect, *i. e.*, the effect of small but distinctly active amts. (1 mg. per kg.), is fall of blood pressure; more characteristic than the action of choline alone is the change from lowered to raised pressure brought about

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by atropine injection. The paper contains a review of former work and a reply to Popielski (*C. A.*, 5, 1456). A. HUNTER.

The Appearance of Medicaments in the Perspiration. HERMAN TACHAU. Frankfurt a/M. *Arch. exp. Path. Pharm.*, 66, 334–46.—After *per os* administration, I from KI, Br from KBr, B from H_3BO_3, phenol, salicylic acid, salol, antipyrine and methylene blue were detected in the perspiration of persons subjected to profuse sweating. As, Fe, BzOH, antifebrin, quinine, chrysophanic acid and phenolph. could not be found. No specific permeability of the cutaneous glands was indicated and where removal in the sweat did occur it was in very small quantities. WALTER A. JACOBS.

Substances which Cause Vasodilatation and Vasoconstriction. S. SAMELSON. Freiburg i/B. *Arch. exp. Path. Pharm.*, 66, 347–51.—The vasodilitating and vasoconstricting effect attributed to choline is due to impurities in the preps. used. Strophanthin exerts a constricting action, digipurate and digitalis dialysate a dilatating effect. The Laewen-Trendelenburg method was used. WALTER A. JACOBS.

The Toxic Action of Trypsin and its Power to Digest Living Tissue. LUDWIG KIRCHHEIM. Univ. Marburg. *Arch. exp. Path. Pharm.*, 66, 352–86.—Proteolytically active pancreas preps. and active pancreatic juice when subcutaneously injected produce, at the place of injection, edema with hemorrhage and subsequent necrosis. It is possible with very active preps. to digest living tissue. Digestion is preceded by the above-mentioned symptoms. By intravenous injection the changes produced are similar to the above. All the effects ascribed to these preps. are connected with the proteolytic components. WALTER A. JACOBS.

The Action of Intravenous Injections of Concentrated Salt and Sugar Solutions. FRANK P. UNDERHILL. Yale Univ. *Arch. exp. Path. Pharm.*, 66, 407–8.—Remarks on the article of Wilenko (*C. A.*, 6, 396). WALTER A. JACOBS.

Narcosis and Lack of Oxygen. IV. ELIZABETH HAMBERGER. Pharm. Inst., Univ. Budapest. *Arch. ges. Physiol.*, 143, 186–8; cf. Mansfeld, *C. A.*, 4, 2666, 3246.—The aliphatic narcotics investigated reduced the solubility of O in olive oil. This diminution varied with the narcotic used. Most active were sulfonal and trional, and least so tetronal. Next to the latter were camphor and oleic acid which in spite of high conc., caused but slight diminution. WALTER A. JACOBS.

Chemotherapeutic Experiments on Tumor Diseased Animals. A. v. WASSERMANN AND D. v. HANSEMANN. *Berl. klin. Wochschr.*, 49, 4–10.—Injection of Na_2Se and Na_2Te directly into the cherry-sized tumors caused these to dissolve and disappear. Intravenous injection of these substances had no effect on the tumors. An eosin-selenium prep. was found of value when introduced intravenously. This prep. is very unstable. F. C. KOCH.

Experiments on the Action of Radium Emanations on the Blood Vessels. A. LOEWY. Berlin. *Berl. klin. Wochschr.*, 49, 109–13.—Expts. on dogs indicate that Ra Ems. act on the vasomotor system, causing lowering of blood pressure and contraction of the lungs; the brain is only slightly altered in vol. The results may in part explain the more rapid effects on respiration in altitudes where the atmosphere is more radioactive than in other localities of the same altitude. F. C. KOCH.

The Influence of Tetrahydro-β-napththylamine upon the Temperature and Respiratory Exchange. N. MUTCH AND M. S. PEMBRY. Physiol. Lab., Guy's Hospital. *J. Physiol.*, 43, 109–24.—The increased heat after administration of the drug appears to bear a definit relation to muscular activity, and is accompanied by an adequate increase in the intake of O and the output of CO_2. The action of the drug is upon the central nervous ystem. J. F. LYMAN.

The Effect of Various Poisons upon the Response to Nervous Stimuli Chiefly in

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Relation to the Bladder. J. N. LANGLEY. Cambridge. *J. Physiol.*, 43, 125–81.—Curare and nicotine produce their effects by an action of the peripheral nerve cells. The changed response of the bladder to stimulation of the sacral nerves produced by curare or nicotine is unaffected, in its essential features, by pilocarpine. Nicotine stimulates the peripheral nerve cells of the bladder, curare in the proper amt. prevents the stimulating effect of nicotine, but a larger amt. of nicotine produces its characteristic effect. Atropine appears to have little effect on the contractions of the bladder caused by injecting 15–30 mg. of nicotine. J. F. LYMAN.

The Action of β-Iminazolylethylamine. H. H. DALE AND P. P. LAIDLAW. Wellcome Physiol. Lab. *J. Physiol.*, 43, 182–95.—A continuation of *C. A.*, 5, 1622. The vasodilator effect of β-iminazolylethylamine in the dog, cat and some other animals is a primary action, peripheral in origin and independent of the integrity of the sympathetic neurones. Its failure to occur in the isolated perfused organ is unexplained. β-Iminazolylethylamine has a slight retarding effect on the coagulation of blood and is the only amine formed by decarboxylation of amino acids, which produces the characteristic effects described. Agmantine, from arginine, is claimed by England and Kutscher (*C. A.*, 4, 3248) to have a similar action. The authors could detect no such effects from this base. An attempt was made to isolate the decomp. products of β-iminazolylethylamine in the liver. The power of liver tissue to destroy β, it appears to be quite limited. Rectal temp. in rabbits is very much reduced after its administration. J. F. LYMAN.

The Reversed Action of the Chorda Tympani on Salivary Secretion. H. H. DALE AND P. P. LAIDLAW. Wellcome Physiol. Lab. *J. Physiol.*, 43, 196–8.—Cytisine, the alkaloid of laburnum seeds, injected intravenously into cats, causes a reversal of chorda tympani stimulation on salivary secretion, giving a secreto-inhibitor effect, followed by a prolonged after-secretion, whose rate is reduced by renewed stimulation. J. F. LYMAN.

Comparative Effects of Yohimbine, Protoveratrine, and Veratrine on Isolated Muscle and Nerve. AUGUSTUS D. WALLER. *Proc. Physiol. Soc.*, 1910, xi–xiv; *J. Physiol.*, 41, xi; *J. Chem. Soc.*, 100, II, 138.—The results described confirm W.'s previous conclusion, that veratrine especially affects muscle, and protoveratrine nerve. The characteristic effect on nerve produced by protoveratrine is not produced by yohimbine, although Tait regards the 2 drugs as pharmacologically identical. J. J. M.

The Significance of the Active Constituent of the Suprarenal Capsules in Conjunction with Local Anesthetics. P. ESCH. *Arch. exp. Path. Pharm.*, 64, 84–104; *J. Chem. Soc.*, 100, II, 136.—The addition of adrenaline to novocaine, alypine, and especially cocaine, intensifies their local narcotic action. This is a specific influence on nerves. The addition of adrenaline to tropococaine does not increase its action. J. J. M.

Renal Glucosuria. LEO POLLAK. *Arch. exp. Path. Pharm.*, 64, 415–26; *J. Chem. Soc.*, 100, II, 417.—By previously treating rabbits partly with adrenaline, partly with cantharidine, a state was produced in which poisons that excite glucosuria (adrenaline, diuretin) caused hyperglucemia, but no sugar in the urin. In this state poisoning with uranyl nitrate caused glucosuria, while the amt. of sugar in the blood was only slightly increased, if at all. This was not merely the result of diuresis, but of a specific increase in the permeability of the kidney to sugar. J. J. M.

Distribution and Excretion of Radium and its Emanation after Internal Administration. E. B. SMITH. Guy's Hospital. *Quart. J. Med.*, 5, 250–63.—After the administration of Ra by mouth or by injection, a wide-spread degree of radioactivity is evident throughout the body. Elimination of Ra takes place principally and rapidly by the bowel, in a lesser and slower degree by the kidneys, and by the liver and skin

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not at all. There is an active excretion by the small intestin, and also probably by the colon. In the lungs there is at all times, after inoculation, the presence of the Em., possibly due to the extreme vascularity of these organs. The Em. is eliminated solely by the lungs. The Em. can be obtained in soln. in various media, and can be introduced into the body in small doses by inhalation, feeding, or by injection, and after such administration there is a general but brief radioactivity throughout the body. The elimination of the Em. takes place with great rapidity, and was complete after large doses in 4 hrs. The duration of the activity in the body, or the time taken in excretion, differs with regard to the nature of the prep. used. Sol. salts, however administered, are rapidly eliminated. The insol. salts, *per os*, are excreted directly by the bowel, and there is no evidence of any absorption and circulation. When given by injection, however, an exceedingly slow elimination occurs by the bowel.

J. H. MITCHELL.

The Poison of Beetle Larvae Used to Poison Arrows by Bushmen. TROMMSDORFF. *Arch. Schiffs- u. Tropenhyg.*, 13, 617.—The Kalahari bushmen of southwest Africa use for an arrow poison larvae probably of *Diamphidia locusta*. Exts. from these cause at point of subcutaneous injection a painful hemorrhagic edema. Systemic effects are produced more rapidly by intramuscular injection. Chief lesion is severe hemorrhagic nephritis. Convulsions precede death, which seems to result from stimulation of the respiratory center followed by paralysis. H. G. W.

The Maximum Production of Hippuric Acid in Animals with Consideration of the Origin of Glycocoll in the Animal Body. A. I. RINGER. Cornell Med. Sch., N. Y. *J. Biol. Chem.*, 10, 327–38.—Goats and rabbits (after administration of BzOH) may eliminate hippuric acid containing more glycocoll than is found preformed in the proteins they metabolize. As much as 38.4% of the total N of the urin of the goat was excreted as glycocoll N in the hippuric acid. Ingestion of benzoate in large amt. results in a considerable increase in total N eliminated. The production of urea is not affected by it. The increase in N elimination is much greater than the N contained in the hippuric acid excreted. The large quantities of glycocoll probably originate from extra protein destroyed, and not from protein which would have been catabolized had no benzoate been given. The diet has no influence upon the amt. of hippuric acid eliminated from ingested benzoate. Expts. to demonstrate production of glycocoll from glycolic acid gave negative results. A calf, 15 days old, which had never received the glycocoll complex in its food, was able to synthesize hippuric acid in large quantity from BzOH. S. R. BENEDICT.

Studies on the Formation of Glycocoll in the Body. ALBERT A. EPSTEIN AND SAMUEL BOOKMAN. Mt. Sinai Hospt., N. Y. *J. Biol. Chem.*, 10, 353–71.—Expts. on feeding BzOH to rabbits led to the following conclusions: No reserve of glycocoll exists in the animal body. The production of glycocoll is progressive, depending to a certain extent upon the amt. of BzOH in the circulation. BzOH does not exert a truly toxic action on protein metabolism, *i. e.*, it does not cause a massive decomp. of protein. Aside from elimination of glycocoll as hippuric acid, metabolism after BzOH ingestion progresses normally. In carbohydrate feeding the extra N eliminated in consequence of BzOH ingestion is entirely in the form of hippuric acid, so that production of glycocoll for the formation of hippuric acid can occur independently of the rest of protein metabolism. S. R. B.

The Influence of Purine Diuretics on the Permeability of the Blood Vessels. FELIX GAISBOCK. Graz. *Arch. exp. Path. Pharm.*, 66, 387–97.—The change in the water and NaCl conc. of the blood after bleeding performed immediately after injection of a purine diuretic was quantitatively the same as that following bleeding alone. There is no foundation for the view that a change in the permeability of the blood vessels

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plays a part in purine diuresis. This holds for normal and nephrectomized animals. The change of the NaCl conc. of the blood after bleeding is dependent upon the Cl content of the tissues. WALTER A. JACOBS.

The Influence of Microbes upon the Action of Salvarsan. II. YAKIMOFF AND KOHL-YAKIMOFF. Frankfurt a/M. *Münch. med. Wochschr.*, 59, 124–6.—A dose of *B. pyocyaneus* endotoxin (0.5 cc.), which makes a mouse only slightly ill, increases the toxicity of salvarsan 3.2 times. The toxicity of salvarsan is increased 4-fold in a mild trypanosome infection when combined with a small harmless dose of pyocyaneus endotoxin. A dose of 0.5 cc. of *Staph. aureus* endotoxin increases the toxicity of salvarsan 3.2 times, 0.2 cc. increasing it 2-fold. Pneumobacillus (Friedlander) endotoxin increased the toxicity 1.6 times and also increased the toxicity in trypanosome mice. *B. subtilis* endotoxin acted only slightly. *B. tetragenus* endotoxin had no appreciable detrimental effect. H. J. C.

The Heart Action of Pilocarpine. FELIX GAISBOCK. Pharm. Inst., Graz. *Arch. exp. Path. Pharm.*, 66, 398–406.—The slowing of the heart action by pilocarpine occurs also after complete nicotine paralysis of the preganglionary vagus fibers. It is therefore of peripheral nature. The seat of the so-called vagus paralyzing action of pilocarpine is also peripheral. WALTER A. JACOBS.

Comparative Studies on the Effects of Alcohol, Nicotine, Tobacco Smoke, and Caffeine on White Mice. I. Effects on Reproduction and Growth. L. B. NICE. Clark Univ. *J. Exp. Zool.*, 12, 133–47.—Five lines of mice were used, one being a control. The others received in addition to regular food the following drugs: (1) 2 cc. of 35% alc. per mouse on crackers and 35% alc. instead of water; (2) 2 cc. of 1 : 1000 nicotine soln. per mouse on crackers and 1 : 1000 nicotine soln. to drink; (3) tobacco smoke for 5 mins. at a time and then airing for 5–10 min., this repeated for 2 hrs. each day; (4) 2 cc. 1 : 100 caffeine citrate soln. on crackers and same soln. for drink. All of the lines receiving drugs gave birth to more young than the controls; the nos. were: control 60, alc. 81, nicotine 104, smoke 111, caffeine 85. The young of the drug-fed mice showed less vitality, the % of those born living to adults being control 100, alc. 88.8, nicotine 82.7, smoke 63.0, and caffeine 74.1%. In no line was the growth of the offspring unfavorably affected. Alc. seems to have a fattening influence, as both the alc.-fed mice and their progeny grew more rapidly and became heavier than controls. Results similar to the above were received for the second generation when subjected to like conditions. Paper contains good bibliography. R. A. GORTNER.

I. ZOOLOGY.

R. A. GORTNER.

Melanin. IV. The Origin of the Pigment and the Color Pattern in the Elytra of the Colorado Potato Beetle, Leptinotarsa decemlineata, Say. R. A. GORTNER. Carnegie Sta. for Exp. Evolution. *Am. Nat.*, 45, 743–56.—The melanin in the elytron of the potato beetle is produced by the interaction of an oxidizing enzyme of the tyrosinase type, and an oxidizable chromogen. The pigment develops in the absence of life, but the development is inhibited when the unpigmented beetle is placed in an atm. of CO_2 or H. The color pattern is caused by the localized secretion of the chromogen, the tyrosinase being distributed over the entire elytron. A part of the paper is polemical against Tower, who claims that the cuticula colors of insects are azo compds. It is shown that Tower's statements are based upon wrong interpretations of his results, and upon errors in the application of chem. data. R. A. GORTNER.

Studies on the Permeability of Cells. E. N. HARVEY. Columbia Univ. *J. Exp. Zool.*, 10, 507–56; *Biochem. Bull.*, 2, 227–34.—The penetration of organic and inorganic hydroxides into both plant (*Elodea* and *Spirogyra*) and animal (*Paramecium*

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and marine eggs) cells was studied, using neutral red as the indicator within the living cell. Both types of cells gave the same result, showing that there are two classes of alkalies. The stronger alkalies (Na, K, Ca, Ba, Sr and Et_4NOH) enter with difficulty, and then only after destroying the normal properties of the cell membrane. The weaker alkalies (NH_4OH, $MeNH_2$ and Me_2NH) enter the cell readily and do not affect the action of the cell surface. Both classes enter dead cells very rapidly. The inorganic alkalies produce marked changes in the cell without themselves entering. This action is probably due to the alteration of the surface membrane. Overton's lipoid theory is upheld, also the surface tension hypothesis of Traube. R. A. GORTNER.

The Effect of Excretion Products of Paramecium on its Rate of Reproduction. L. L. WOODRUFF. Yale Univ. *J. Exp. Zool.*, 10, 557–81.—The accumulation of the excretion products of *Paramecium* in the culture medium lowers the rate of division. The greater the vol. of the culture medium the greater is the rate of reproduction. R. A. GORTNER.

Chemical Properties of Hay Infusions with Special Reference to the Titratable Acidity and its Relation to the Protozoan Sequence. M. S. FINE. Yale Univ. *J. Exp. Zool.*, 12, 265–81.—"Phenolphthalein acidity" and "methyl orange alkalinity" were detd. in various hay infusions for periods up to 205 days. "The acidity of the hay infusion is essentially due to bacteria. The sequence of protozoa and the course of titratable acidity possess no intimately mutual relation." R. A. GORTNER.

Protein Resorption. III. OTTO COHNHEIM. St. Naples. *Z. physiol. Chem.*, 76, 293–7.—Expts. on the resorption of proteins and protein cleavage products through intestinal segments of certain fish, *Crenilabrus pavo*, *Labrus turdus* and *Labrus festivus*. Tyrosine, alanine, aspartic acid and glutaminic acid were studied. The expts. show that during resorption of protein and amino acids a partial production of NH_3 takes place. G. M. MEYER.

12. FOODS.

W. D. BIGELOW.

Food Standards. A. MCGILL. *J. Soc. Chem. Ind.*, 31, 51–4. E. J. C.

Classified Table of Food Laws and Regulations. A. BONN. *Ann. fals.*, 5, 20–5.—The table gives the leading classes of foods and references to the laws, decrees and decisions prohibiting or controlling their adulteration. W. D. BIGELOW.

Food Analyses. H. H. MANN. *Ann. Rpt. Dept. Agr. Bombay*, 1909–'10, 46–8.—Among other analyses, the comp. of banana or plantain flour is given. The demand for the product is much smaller than the supply. WM. P. GARRETY.

Food Economy. *Bull. Kans. Bd. Health*, 7.—This contains a chart summarizing data relating to food and the principles of nutrition, showing the amts. of nutrients and energy purchasable for 10 cts. in various food materials, at current prices in Topeka, Kansas, June 20, 1910. WM. P. GARRETY.

Colloid Chemistry of Foods. H. BECHHOLD. *Chem. Ztg.*, 35, 1401–3.—Food substances are mainly in colloidal condition and the problems of food analysis and of cooking are applications of colloid chemistry. Examples from the literature show the application of colloid chem. methods such as the detns. of ability to imbibe water, coagulation conditions, surface tension, viscosity and the use of ultra-filtration. These give better indication of nutritive value than ordinary chem. detns. and a plea is made for their more extended use. E. L. P. TREUTHARDT.

Dirt in Food. EMILY L. DOVE. *J. Roy. Sanit. Inst.*, 32, 321–35.—Dirt in food

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purchased in London markets was detd., and the bacteria, inorganic material, and organic material composing the dirt was ascertained. Clean flour was more thoroughly digested than dirty flour in a given time, in artificial digestion. Feeding expts. with guinea pigs gave no conclusive results. WM. P. GARRETY.

How to Plan Meals. E. S. JACOBS. *J. Home Econ.*, 3, 162–8.—Balanced menus are given, showing cost, and energy and protein content. A table for computing wt., cost, and energy and protein content of individual portions of many common foods is given, the cost based on current retail prices in Washington, D. C., during January, 1911. WM. P. GARRETY.

Changes in the Physical and Morphological Character of Foodstuffs, Meat, Fish, and Milk by Cold. BUTZLER. *Deut. Schlacht u. Viehhof Ztg.*, 10, 623, 624, 639–41. —This discussion summarizes data presented at the Sec. Intern. Cold Storage Congress in Vienna. WM. P. GARRETY.

The Use of Whale Flesh as Food. R. C. ANDREWS. *Nat. Geogr. Mag.*, 22, 411–42; through *Sci. Am.*, 105, 56–7.—The use of whale flesh as food, especially in Japan, is described, and the possibility of a more general use of the product discussed. WM. P. GARRETY.

A Test for the Keeping Quality of Milk. WILH. MORRIS. *Z. Nahr. Genussm.*, 22, 459–64.—By a "non-keeping" milk is meant one that curdles on heating; this may be due either to chem. changes in the casein or an abnormality of the fresh milk. The former may be due either to increased acidity or the introduction of such enzymes as rennin, so that the old alc. test, which depended upon the degree of acidity, is not alone a safe guide as to whether or not a milk can be heated without curdling. The alizarin-alcohol (alizarol) test enables one to det. not only the keeping quality of the milk but also the reason for its curdling, *i. e.*, whether due to acidity or an enzyme other than lactic. This test is made by mixing 2 cc. of a satd. soln. of alizarin ($C_{14}H_6O_2$-$(OH)_2$) in 68% (by vol.) EtOH with 2 cc. of the sample and noting the color. With normal fresh milk the color is an intense lilac-red (red clover blossoms); with 12° (Soxhlet) acidity, and a yellow-brown color and very heavy curd, a pure lactic fermentation is indicated; the same acidity and curd with a dark reddish brown color indicate combined lactic acid and rennin, while with pure rennin the color is raspberry-red. A table is appended showing the time milks of varying acidity and "alizarol" test will keep before curdling, if boiled and at 20°. H. S. BAILEY.

Hydnocarpus Fat. K. LENDRICH, E. KOCH AND L. SCHWARZ. Hyg. Inst., Hamburg. *Z. Nahr. Genussm.*, 22, 441–59; cf. *C. A.*, 4, 234, 3176; 5, 2003.—The chem. and optical characteristics of oils extracted from 4 species of hydnocarpus are given, and the toxic effect of the hydnocarpus oil upon dogs noted. The authors conclude that the poisonous margarine contained a fat of the hydnocarpus group. This oil, which is known as "Cardamon" oil, differs from other fats by containing acids of the $C_nH_{2n-4}O_2$ series. From a practical standpoint only *H. wightiana* and *venenata* have any value. Dogs fed with these oils, whether with the minimum toxic dose or a large excess, always vomited repeatedly and showed the symptoms of acute stomach irritation. The poisonous property of the oil appears to be associated with the presence of an ethylene group in the optically active fatty acid. The fact that this compound has a great tendency to become satd., and when satd. is no longer poisonous, would indicate that its toxicity may be due to its affinity for H. H. S. BAILEY.

The Presence of Bacteria in the Flesh of Normal Slaughtered Animals and the Technic of the Bacteriological Meat Examination in Forced Slaughter. ZWICK AND WEICHEL. *Kaiserlichen Gesundheitsamte*, 3, 327–37.—In 77 exams. of organs and muscles of freshly slaughtered cattle and hogs, made by 5 different methods, 6 samples of

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liver and 1 of neck muscle contained bacteria (*B. coli comm., Staphylococc. aureus*). The authors found the method of Conradi (*Z. Fleisch Milchhyg.*, 19) not suited to the needs of practical bacteriological meat inspection. The following has proved satisfactory. As soon as possible after the slaughter, a cube of meat 6–8 cm. on a side is cut with sterilized instruments from the deep lying muscles and a similar one each from the liver and spleen. The surface of the meat is seared, the sample cut in two and pieces the size of a bean placed on agar, Drigalski-Conradi and malachite green plates; also in bouillon and, to show the presence of anaerobic bacteria, in 1% grape sugar. The bouillon flask is examd. by hanging drops after 3, 6 and 9 hrs. in the incubator; also an agar, a Drigalski-Conradi, and a malachite green plate are all sown with material from the bouillon flask. The rest of the exam. is made in the usual way. A. W. BROOMELL.

Some Post-mortem Alterations of Meat. J. B. BUXTON. *J. Roy. Inst. Pub. Health*, 19, 460–9.—Bacterial changes, preservation, and other topics are discussed. WM. P. GARRETY.

Meat Poisoning—its Nature, Causation, and Prevention. E. J. MCWEENEY. *J. Meat and Milk Hyg.*, 1, 1–10, 65–71, 129–37, 192–7.—This treats of poisoning by typho-coli microörganisms, putrefactive aerobes, and obligate anaerobes, in meat and other foods, animal and vegetable. WM. P. GARRETY.

Spoiled Canned Fish. O. SAMMET. *Hyg. Rundschau*, 21, 1013–7.—Swollen cans are unsafe although the appearance and odor of the contents may be normal. While the flora of such cans is usually harmless, dangerous bacteria are sometimes found in them. WM. P. GARRETY.

The Food of the Oyster and the Mechanism of its Contamination by Polluted Water. FABRE-DOMERGUE. *Compt. rend.*, 151, 829–31.—Shellfish pollution is discussed. WM. P. GARRETY.

Studies of Fish Sausage. P. BITTER. *Hyg. Rundschau*, 21, 181–9.—The product compares favorably with similar ones in price and palatability. Analyses showed: Water, 66.64%; protein, 21.9%; fat, 9.33%; ash, 2.01%. WM. P. GARRETY.

The Influence of some Preservatives upon the Keeping Qualities and Composition of Butter and Oleomargarine. K. FISCHER AND O. GREUNERT. Bentheim. *Z. Nahr. Genussm.*, 22, 554–82.—Butter and oleomargarine, both pure and mixed with the usual amts. of boric, salicylic and benzoic acids, and with 3% NaCl, were examd., when fresh and at intervals of 1, 3, 4 and 6½ months. The detns. included moisture, *n*, R.-M. no., sapon. no., acidity (both of original material and of fat), N (total and amino) lactose, physical appearance and odor. The only striking chem. change on aging appeared to be the increase in amino N and acidity. These increased with the degree of spoilage. All samples except those containing 3% NaCl arrived at an advanced stage of decomp. during the period of the expt., the degree of spoilage being independent of the amt. of preservative present. Samples containing 3% NaCl remain fit for use under reasonable conditions for a long time. Boric, salicylic and benzoic acids do not improve the keeping qualities of butter or oleomargarine. A. F. SEEKER.

What Influence has the Water Content upon the Quality of Butter? HESSE. *Molk. Ztg. (Hildesheim)*, 25, 159–62; *Expt. Sta. Record*, 24, 678.—The quality of butter was found to be independent of the water content if the % of water ranged between 12 and 16. Even these limits can be exceeded and the quality remain unimpaired if the butter is made from good milk and properly handled. J. J. M.

Interpretation of the Analytical Results for Milk Adulterations. A. FARINES. *Ind. lait. (Paris)*, 36, 17–24; *Expt. Sta. Record*, 25, 113.—After discussing the various factors which influence the comp. of milk, F. describes the mathematical and other

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methods for detecting the addition of water, the removal of cream, and the simultaneous removal of cream and addition of water. J. J. M.

Determination of Milk Solids. A. SPLITTERGERBER. Frankfort a/M. *Z. Nahr. Genussm.*, 22, 583–99.—The total solids were detd. gravimetrically in 63 samples of milk under various conditions and compared with those calc. by Fleischmann's formula. The values obtained by drying alone or with addition of alc. or acetone agree closely with the calc. ones (greatest difference 0.18%). Drying for 20–30 min. in a Soxhlet water or glycerol oven, or for 1 hr. in an ordinary water oven, was sufficient. The addition of AcOH or of AcOH and formalin gave high results. Good checks were obtained with normal, skimmed, or watered milks and with those of very high fat content. The gravimetric method on old samples gave slightly lower results than those obtained on the fresh milks (0.11–0.27%). In a milk containing Ca sucrate the gravimetric detn. was about 0.2% higher than the calc., while in one containing Na_2CO_3 the gravimetric detn. was 1.5% lower. In these cases the calc. result was taken as the correct value and the discrepancy looked upon as indicative of adulteration of this kind. E. L. P. TREUTHARDT.

Saltpeter as a Corrective for Milk with Flavor Affected by Turnips. F. REISZ. *Z. Nahr. Genussm.*, 22, 731.—A sample of milk tested for nitrates gave a strong blue coloration, although the fat content was 3.5% and addition of water containing this amt. of nitrates was unlikely. Investigation showed a more or less common practice among dairies of adding 10 g. KNO_3 to 100 l. of milk to remove the flavor from turnips, both in milk to be sold as such and in that from creameries and cheese factories. In view of its harmful effect, the addition of KNO_3 should be prohibited. A. W. BROOMELL.

Some Remarks Concerning Dried Milk. F. BALLNER AND K. R. VON STOCKERT. *Z. Nahr. Genussm.*, 22, 648.—The manuf., chem. comp., and bacterial content of milk powder is discussed briefly. An expt. to ascertain whether the proteins of milk were changed by the high heat of the drying process is described. The complement-fixation method was employed. The milk antisera were made by immunizing rabbits with boiled milk. Various dilns. of the milk powder, "Gallak," were used as antigens—as controls dilns. of boiled and unboiled milk were employed. To 1 cc. of the antigen-diln., 0.05 cc. of lactoserum, and the guinea-pig complement were added. The hemolytic system consisted of 1 cc. of a 5% suspension of ox-blood corpuscles in physiological salt soln. and 0.001 cc. of the ox-blood corpuscle amboceptor. No hemolysis occurred in those instances in which dried milk was used sooner than was the case in the controls of fresh and boiled milk. Complete hemolysis occurred at dilns. of 1 : 40,000 in all 3 cases. This indicates that the proteins of dried milk act exactly as those of normal milk. Milk powder is favorably commented on as a substitute for fresh milk in the army and navy commissariats, but has the drawback that it develops a tallow-like odor on long storage. W. A. BRANNON.

Relations between Test for Reductase, Acidity and Alcohol Test. W. MORRES. Friedland, Bohemia. *Milchwirtsch. Zentr.*, 2, 441–5.—The more quickly methylene blue is reduced the larger is the number of bacteria in milk. The alizarin-alc. test gives indications more or less parallel with the reductase test and the degree of acidity. L. L. VAN SLYKE.

Lactic Fermentation in the Manufacture of Soft Cheese and of Butter. P. MAZÉ. Pasteur Institute. *Milch Ztg.*, 40, 415–7.—The relation of acidity of milk is of special importance in such kinds of cheese as Brie and Camembert. L. L. V. S.

Something about Casein. G. GUADEBERG. *Milch-Ztg.*, 40, 456.—Carelessness in preparing com. casein is discussed and full directions are given for making an article

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of good quality. Precipitation is made at ordinary temp. by natural souring of skim-milk, using 5–10% pure culture of lactic acid bacteria. When pptn. takes place and before curd becomes completely solid, it is cut with curd-knife and a short time after is slowly heated to 42–45° and then let stand 5 min., after which whey is removed, the curd allowed to drain and finally dried with occasional stirring at 40–45°

L. L. VAN SLYKE.

Outline of Course of Study in Food Chemistry for Food Chemists, Physicians, Lawyers, Administrative Officers, Industrial and Commercial Experts. K. v. BUCHKA, W. KERP AND TH. PAUL. *Milch Ztg.*, 40, 458. L. L. VAN SLYKE.

Valuation of Milk According to Quality. J. KAUFMANN. *Milch Ztg.*, 40, 477.—A discussion of relation of taste, odor, etc., of milk to butter making.

L. L. VAN SLYKE.

Use of Metallic Containers for Edible Fats and Oils. J. A. EMERY. Reprint from 26th Ann. Rept. of Bur. of Animal Ind., *U. S. Dept. of Agr.*, 1909, 265–82; *J. Soc. Chem. Ind.*, 30, 1169.—In testing the action of oils and fats upon different metals, thin sheets, 2–5 sq. cm. in area, were cleaned, dried, and weighed, then bent and completely immersed in a wide-mouthed glass bottle containing the fat, so that the edges rested upon the bottom of the bottle. After the desired period of action at ord. temp. or at 37° (up to 6 weeks) the metal dissolved by the fat was sepd. by shaking the fat with dil. acid and was detd. in the aq. layer. In the case of tin, however, it was necessary to ignite the fat with a mixt. of Na_2CO_3 and KNO_3 and to det. the metal in the fused mass. Although generally the solvent action of the fat increased with the rise in the acidity, notable exceptions were observed. With cottonseed oil very little action took place notwithstanding the fact that its relatively high acid value was trebled in the course of the expt, whereas maize oil, with an equal or lower acidity, had a pronounced action upon the metals in every instance except one. Increase in temp. accelerated the solvent action, and in cases where a protective coating of insol. metallic soap was formed at the ordinary temp., the metals offered less resistance to the action of the fats as the temp. rose. O also favored the soln. of the metals, portions not submerged in the fat being attacked to a greater extent than those below the surface. This difference was more marked in the case of oleic acid than in that of the oils and fats examd. The metals least attacked were Al, Fe, and Sn in the order mentioned, whereas Zn, Cu, and Pb were attacked fairly readily. The last 3 metals should not be used for vessels intended for edible oils. J. J. M.

Olive Oil. A. MCGILL. Inland Rev. Dept., Canada, *Bull.* 229, 15 pp.—Result of the analysis of 139 genuin and 13 adulterated samples of oil. The following standard is proposed: $d_{15.5}$, 0.9140–0.9196; $n^{15.5}$, 1.4700–1.4718; Maumené no., 42–52; I no. (Hübl), 77–94; sapon. no., 185–95; fatty acids not over 3.5%. E. M. CHACE.

Food Value of Dried Surinam Bananas. J. E. Q. BOSZ. *Indische mercuur*, 33, 695–6.—Analyses are given and discussed. WM. P. GARRETY.

Burbank's Spineless Prickly Pear. E. V. FLACK. *Chem. News*, 104, 313.—Analysis of "Santa Rosa" (Ficus Indica Class) grown in England from California cuttings. Moisture 92.25, proteins 0.61, fat 0.14, carbohydrates 4.31, crude fiber 1.22, ash 1.47, silica 0.031%. Fair agreement with Cal. grown plant. A. W. BROOMELL.

Presence of Arsenic in Fruit Sprayed with Lead Arsenate. P. J. O'GARA. *Science*, 33, 900–1; *Expt. Sta. Record*, 25, 642.—Many brands of Pb arsenate used for spraying fruit do not show sufficient uniformity in As content, nor is the As found in the proper combination with Pb. A number of apples held in storage, which had developed red and black spots, contained As, and the badly spotted fruits showed about twice as much As as unspotted fruits from the same lot. A 10 g. sample of badly spotted apple skin

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showed 0.05 mg. of metallic As. Certain papers used for wrapping apples and pears very frequently contain small amts. of As, as well as other substances which may or may not have an injurious effect. In one case a shipment of pears of one variety from the same orchard was wrapped in 2 different brands of paper. An exam. of the whole shipment, after it had been in storage, showed that the condition of the fruit corresponded exactly with the brand of paper used, the ripening process of one lot being much in advance of the other. J. J. M.

The Chemical Composition of American Grapes Grown in Ohio, New York and Virginia. Wm. B. Alwood. U. S. Dept. Agr., Bur. Chem., *Bull.* 145.—The comp. is given of the leading varieties of grapes used in these states for the manuf. of wine and unfermented grape juice, as well as of promising seedlings. W. D. Bigelow.

The Blanching of Vegetables. *Pure Products*, 7, 318–20; *Expt. Sta. Record*, 25, 567.—A considerable amt. of data is summarized regarding the relative losses sustained in steam-cooked vegetables in comparison with those cooked in hot water. Cf. a previous note by Maurel and Carcassagne (*E. S. R.*, 22, 368). J. J. M.

Canned Artichokes and Artichokes Preserved in Oil. *Bol. min. agr. indus. com.* (*Rome*), 9, 35, 36.—This is a description of Italian methods of preserving artichokes. Wm. P. Garrety.

A New Asparagus Product. *Pure Products*, 7, 320; *Expt. Sta. Record*, 25, 567.—A product designed for use in making asparagus soups and similar dishes is described which is prepared by sepg. the soft pulp from the fiber of fresh asparagus and preserving it in cans in the form of a thick paste. J. J. M.

Foreign Varieties of Tomato Conserves. *Pure Products*, 7, 133–6; *Expt. Sta. Record*, 25, 212.—A discussion of the manuf. of tomato puree, tomato catchup, English tomato sauce, tomato jam, tomato sirup and whole tomato conserves. The products of the Romance countries are particularly considered. J. J. M.

Honey. *Bol. dir. fomento* (*Peru*), 8.—This contains analyses of 27 samples. Wm. P. Garrety.

Foreign Honey. K. Lendrich and F. E. Nottbohm. Hamburg. *Z. Nahr. Genussm.*, 22, 633.—Samples of honey from 63 shipments arriving in Hamburg were examd. and found in most cases to resemble German honey. Those from Hawaii showed striking peculiarities in high ash (0.44–0.63%), of which NaCl averaged 0.38%, while acidity, protein, protein ppt. (Lund), and non-sugars were low. Hawaiian honey probably owes its characteristics to the peculiarities of bee culture on the islands. Only 1 sample of foreign honey gave a positive Fiehe test and this showed evidences of having been heated too high. The water content (14.59–21.34%) in all samples was far below the limit allowed by the German standard. Full analytical data are given. A. F. Seeker.

The Multirotation of Honey. L. Rosenthaler. Univ. Strassburg. *Z. Nahr. Genussm.*, 22, 644.—The degree of multirotation was ascertained by dissolving 10 g. of honey in sufficient water to make a total vol. of 100 cc. The soln. was clarified with $Al(OH)_3$ and the first reading (a) made 15 min. after mixing honey and water. A few bubbles of dry NH_3 were then passed through the soln., and after standing 30 min. a 2nd reading (b) taken. The sp. multirotation was then calc. from the formula $100\ (a—b)/L\ c$, in which L = length of tube and c = wt. of dry substance in 100 cc. of soln. In 41 samples of genuin honey this value varied from 0.71 to 18.07 and appeared to depend upon the degree to which crystn. had occurred. Factitious honey (5 samples) gave values between 2.05–15.08, and glucose (2 samples) 1.29–2.60. R. considers this detn. of no value in the exam. of honey. A. F. Seeker.

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The Manufacture of Marmalades. E. WALTER. *Pure Products*, 7, 11–6; *Expt. Sta. Record*, 24, 516.—A general discussion. J. J. M.

A Method for the Separation of the Seven Permitted Coal-tar Colors when Occurring in Mixtures. T. M. PRICE. U. S. Dept. Agr., Bur. Anim. Ind., *Circ.* 180.—The method, given in detail, while not perfect, gives excellent results. W. P. G.

Chemical Preservatives. V. H. SERGER. *Chem. Ztg.*, 35, 1202–3; cf. *C. A.*, 6, 263.—A discussion of the use of H_2SO_3 as a food preservative. Methods for its detection and detn. are given. This series of papers is concluded by a list of food preservatives sold under fanciful names, together with a statement of their comp. P. B. DUNBAR.

Preservatives in Food. H. E. DAVIES. *J. Roy. Inst. Pub. Health*, 19, 288–92; *Expt. Sta. Record*, 25, 569.—A discussion of D.'s work, particularly of that which has to do with the detection of usual preservatives, as Na_2O_2 in milk. An attempt is being made to use preservatives which will evade the skill of the public analyst. J. J. M.

The Humphries Process of Treating Flour. *Millers' Gaz.*, 34, 546–8; *Expt. Sta. Record*, 24, 761.—A popular summary. If a water ext. of bran products is added in bread-making, ash constituents excluded in the manuf. of white flour are restored to the bread. J. J. M.

The Demonstration of Lead and other Metals in Flour. K. SCHERINGA. Nijkerk. *Pharm. Weekblad*, 48, 1317–9.—The method suggested is to make a thin suspension of flour in water and to add for Pb a few drops of NH_4Ac and AcOH, for Cu H_2SO_4. Place in a filter paper or parchment sack, in a funnel whose neck is so stopped with cotton as to let the water which it contains flow a drop at a time, metal to be tested for in filtrate. In a few minutes 1 mg. white Pb can be detected in 10 g. flour. This method may also be used for H_3BO_3. V. E. HENDERSON.

Composition of the Ash of Pickles. E. H. S. BAILEY. *Science*, 33, 345; *Expt. Sta. Record*, 25, 411.—The author has made numerous analyses of the ash of normal pickles for the purpose of judging pickle conserves in regard to the addition of alum for hardening. J. J. M.

Alum in Pickles, Bleaching Flour, Board of Health Regulations Regarding Minimum Standards of Food and Drugs, and other Pure Food Topics. *Ann. Rpt. Bd. Health Ind.*, 28, 88–95, 180–208.—This contains circular letters, proposed standards, rules for chem. analyses and for bacteriological and pathological exams. W. P. GARRETY.

The Use of Lead Caps on Bottles Containing Mustard or other Vinegar Products. G. PERRIER AND A. FOUCHET. Rennes. *Ann. fals.*, 5, 17.—A plea for conservatism in regulation against the use of metal caps on bottled vinegar products. E. L. P. TREUTHARDT.

Chemical Knowledge of Paprika. A. v. SIGMOND AND M. VUK. Budapest. *Z. Nahr. Genussm.*, 22, 599.—A no. of samples of Hungarian paprika were found to average 58% pericarp, 32% seeds, 4.5% placentae and 5.5% stems. The amt. of seed found in other varieties were: Turkish 28.8%, Spanish (sweet) 40.7%, Spanish (sharp) 40.6%, Indian Ghat chillies 62%, Indian Bose chillies 61.2%, Indian Madras chillies 56.7%, Indian Mulkapore chillies 63%. The av. amt. of ether ext. and the I no. of the ext. (in brackets) found in various parts of the Hungarian fruit (dry basis) were: Pericarp 14.8% (133.9), seed 32.09 (139.9), placentae 13.81% (133.6), and stem 2.54% (111.3). The chem. data obtained upon paprika other than Hungarian did not show sufficient differences to enable sharp distinctions to be drawn. For moisture and ether ext. detns. the material should be dried in an atm. of coal gas, otherwise oxidation changes in the oil occur which produce low results in both cases. Ow-

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ing to the natural variation of the I no. of the ether ext. sophistication with 1–2% of rape oil cannot be detected by this detn. A. F. SEEKER.

Vanilla. H. KÜHL. *Suddeut. Apoth. Ztg.*, 51, 772.—Gives sources and properties of the com. article. % of vanillin and ash vary greatly: 0.75–2.9% and 3.4–5.6%. In some instances the crystals of vanillin removed from the bean have been replaced by BzOH. Vanilla is judged by its quality and aroma. Botanical and chem. characteristics are common to all kinds. A. VORISEK.

The Detection of Benzoic Acid in Coffee Extract. HERMAN C. LYTHGOE AND CLARENCE E. MARSH. *J. Ind. Eng. Chem.*, 3, 842.—Coffee ext. contains a substance soluble in ether and yielding a ppt. with $FeCl_3$, thus interfering with the detection of BzOH by the ordinary methods. The NH_4 salt of this substance gives ppts. with salts of Mn, Ni, Mg, Ca, Ba, Fe and Cu, while NH_4 benzoates ppt. only with salts of Fe and Cu. A method for detecting BzOH based on these differences is given. A. F. SEEKER.

The Use of Dried Yeast for the Preparation of Molasses Food. O. FALLADA. *Oesterr-Ung. Z. Zuckerind.*, 40, 709–14.—Beer yeast has given good results as a cattle food. It is rich in N matter. One analysis shows 9.46% water, 43.38% albumin, 5.37% other N matter, 3.12% fat, 6.90% ash. By mixing 800 g. of this with 1 kg. of molasses a good product was obtained which kept well. A method of analyzing these products is also given. A. H. BRYAN.

Indian Cane as a Fodder and Stand-by. A. H. HAYWOOD. *Agr. Gaz. N. S. Wales*, 22, 79–81; *Exp. Sta. Record*, 25, 70.—This includes favorable comments by stock farmers concerning the use of Indian cane as a fodder plant in Australia. An analysis of the cane grown on volcanic soil is as follows: Moisture 69.60, albuminoids 2.25, ether ext. 0.19, carbohydrates 10.08, fiber 6.84, and ash 11.04%. J. J. M.

Contribution to the Knowledge and Determination of the Carbohydrates. J. KÖNIG, W. GREIFENHAGEN AND A. SCHOLL. *Z. Nahr. Genussm.*, 22, 705–23.—A review of previous work with much new material presented on the detn. of carbohydrates by oxidation with $KMnO_4$ and by 2 polarimetric methods. By b. solns. of several pure sugars, glycerol and MeOH with 0.2 *N* $KMnO_4$ and 10% KOH, acidifying and titrating the excess of $KMnO_4$, it was found that the substances were completely oxidized to CO_2 and H_2O, in good agreement with the theoretical equations. By varying the strength of the oxidizing solns. many sugars were quantitatively converted into oxalic acid and CO_2. The former was pptd. as CaC_2O_4 and weighed as CaO; the CO_2 was absorbed and weighed. Two polarization methods, those of Lintner (*Inaug.-Dissert. München*, 1907) and Ewers (*Z. Nahr. Genussm.*, 16, 509), were compared for the detn. of starches and some other materials. Lintner employs a more conc. HCl without heat, while Ewers uses a more dil. HCl and heats 15 min. on the H_2O bath. Both methods are found applicable to all starches. The sp. rotation by Lintner's method agrees well for the various starches and is about +202°. The values for Ewer's method vary; for corn, rice, wheat, rye, barley and oat starches, fair agreement to 183° is found. Before hydrolysis of feeding stuffs, it is necessary to wash the sample well with cold H_2O, EtOH and Et_2O to remove other optically active substances. Cellulose, hemicellulose and pentosans do not affect the results by either method. Cinnamon and cocoa give good results by Lintner's method, pepper, better results by Ewer's. A. W. BROOMELL.

Destructive Action of Butter Oil on Concrete (BOGIE). 20. Reducing Sugar Methods (WALKER). 11B. Inversion of Sugar by Bees (KORNDOERFER). 28. Lead Arsenate in Viticulture (MUTTELET, TOUPLAIN). 15.

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U. S., 1,017,144, Feb. 13. S. GIRONCOLI. **Preserving raw animal foods.**

U. S., 1,017,361, Feb. 13. M. A. ADAM. **Aerating dough.**

U. S., 1,017,412, Feb. 13. G. D. HARRIS and J. S. POLLARD. **Apparatus for drying foods.**

U. S., 1,017,777, Feb. 20. C. H. LOEW and A. REUTSCHI. **Pasteurizer.**

U. S., 1,018,388, Feb. 20. G. D. HARRIS and J. S. POLLARD. **Apparatus for drying foods.**

14. WATER, SEWAGE AND SANITATION.

EDWARD BARTOW.

The Chemical Examination of Waters and Trade Effluents. J. A. S. MORRISON. *J. Am. Leather Chem. Assoc.*, 6, 544–65.—Trade effluents should be sampled by taking small samples at definit intervals, the vol. of these samples being roughly proportional to the rate of flow. If the flow be fairly const. 200 cc. samples taken every 5 min. for 1 hr. gives an av. sample large enough for all analytical detns. Methods for the detn. of the following items as used in the West Riding of Yorkshire Rivers Board are given fully: Total solids, solids in suspension, solids in soln., O absorbed, alkalinity or acidity, hardness (Clark's method; total and permanent hardness), (Hehner's method; temporary and permanent hardness), magnesium salts causing permanent hardness (Winkler's method), chlorides, nitrogen—ammoniacal, albuminoid, organic, nitrous (sulfanilic acid method and *m*-phenylenediamine method)—nitric N, O in soln., putrescibility, fatty matter, S compds., iron—total, ferrous, ferric—interpretation of results, standards of purity. CHARLES R. OBERFELL.

Oil Separators. C. VRINS-HZ. *Arch. Suikerind.*, 19, 1721–44.—The author describes and discusses different methods and forms of app. for the sepn. of the oil from the condensation water from steam engins. P. A. YODER.

The Maintenance of the Purity of Surface Waters and the Industry. HOFER. *Allgem. Fischerei Ztg.*, 35, 526–29; *Wasser u. Abwasser*, 5, 20–21.—In the reckless discharge of trade waste into surface waters, the industries themselves are the losers because money could be saved by the utilization of some of the waste products. Some instances are cited to substantiate the statement. ARTHUR LEDERER.

Note on a Boiler Scale Consisting of Zinc Silicate. H. LOWE AND W. F. LOWE. *J. Soc. Chem. Ind.*, 30, 1440.—A scale showing on analysis 63% ZnO choked the pipes of a hot-water heating system. The Zn was derived from a galvanized storage tank. Complete analyses of water supply and incrustation are given. R. B. DOLE.

The Purification of Boiler Feed Water. R. BERNARD. *Mon. sci.*, [5] 2, 5–18.—The common explanations of scale formation and corrosion are given and the ordinary rapid methods of detg. the dosage of CaO and Na_2CO_3 for proper purification are discussed in much detail. The general principles of the operation of softening machinery are outlined and the widepread use of boiler compds. in France is deplored. R. B. D.

Disinfection of Well Water with Chemicals. I. KRUSZEVSKII. *St. Petersburger med. Wochensch.*, 36, 89–91; *Wasser u. Abwasser*, 5, 33–4.—The presence of 0.1 H_2O_2 in drinking water is not harmful even on continuous use. Heating to 40–50° eliminates the flat taste. 0.04% H_2O_2 suffices for the disinfection of waters of unknown origin. The cost of the disinfection is very high. Free Cl or Br is much cheaper. 0.2 g. of available Cl resulted in the destruction of all bacteria. K. does not, however, attach much practical importance to the use of Cl or Br for the disinfection of drinking water. ARTHUR LEDERER.

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New Method of Chemical Treatment of Water. W. B. BULL. *Proc. Ill. Water Supply Assn.*, 1911, 66.—"The chloride process" produces ferrous or ferric chloride and NaOH, using an electrolytic cell, salt brine, and Fe filings. Salt brine flows slowly into the cathode chambers, is decomposed into NaOH which flows directly to the water to be purified. Cl, formed at the anode, passes upward through a conical chamber containing Fe filings, leaves there as neutral ferrous or ferric chloride, and is fed to the water to be purified where it is pptd. by the NaOH previously added. One pt. Fe soln. to 1000 pts. H_2O gives coagulation equiv. to 1 g. alum per gal. The estd. cost of reagents to equal 1 g. per gal. alum is 45 cents or less, per mil. gal. or about $^1/_3$ cost of alum. Process is continuous. A test by the Toledo Wtr, Wks. showed saving of not less than $^4/_5$ of present annual cost of coagulant (alum). D. K. FRENCH.

Stoppage of Steam Pipes. S. W. PARR. *Proc. Ill. Water Supply Assn.*, 1911, 61.—Describes a deposit of $NH_4HCO_3.H_2O$ containing 21.35% NH_3 and 49.80% CO_2. This deposit completely filled 5–6 in. of an upright $1^1/_4$ in. riser of a domestic steam heating system. The presence of this NH_4 salt in the steam was due to the liberation of NH_4 compds. by free alkali which was present in the water in question. Local chilling probably caused crystn. D. K. FRENCH.

The Use of Galvanized Iron Pipe in Water Conduits. J. DROST. Holstein. *Apoth. Ztg.*, 26, 899–900. W. O. E.

The Sterilization of Swimming Pools. NORMAN ROBERTS. *Eng. News*, 67, 73–4.—The continued application of small doses of $Ca(OCl)_2$ with occasional complete sterilization is recommended. An 0.85% soln. of NaCl will disguise the taste of $Ca(OCl)_2$ and traces of NH_3 will increase its bacterial efficiency. Sterilization by O_3 and ultraviolet rays is regarded as efficient and practical. S. T. POWELL.

Bacteriology of the Swimming Pool. K. N. ATKINS. *Proc. Ill. Water Supply Assn.*, 1911, 72.—Investigations have shown intestinal infections and eye and ear inflammations liable from swimming in contaminated water. Many cases are cited. Gonorrheal infection not so liable. Expts. were conducted at the Univ. of Chicago, first as to normal increase and then with addition of hypochlorite. *B. coli* were detected in 5 cc. of H_2O or less, after 6 hrs. use of tank. First 3 or 4 days showed marked increase in no. of bact. after which there was a sharp decline. Increase was entirely due to contamination from bathers. $Ca(OCl)_2$ resulted in 95% destruction of bacteria in an hour. The effect of 1 pt. per mil. $Ca(OCl)_2$ lasted 2 days. D. K. FRENCH.

Changes in the Fauna Due to Stream Regulation, Drainage and Irrigation. W. SEDLACZEK. *Oesterr. Wochenschr. Baudienst, Jahrg.*, 1911, 466–9; *Wasser u. Abwasser*, 5, 20. ARTHUR LEDERER.

An Instance of the Significance of a Bacteriological Examination of Water. H. KÜHL. *Suddent Apoth. Ztg.*, 51, 483–4.—A chem. analysis of a water which was found to be the cause of much sickness and 2 fatal cases, showed no other abnormality save the absence of NO_2 and NO_3. The presence of numerous microörganisms, among which were found the denitrifying bacteria and the urin bacilli, showed pollution. No common pathogenic germ could be identified. By planting those that grew in malachite green agar in alizarin agar at 30°, it was found that the alizarin-agar baccili were short, plump and very active. A white mouse, inoculated with these developed a paralysis of the posterior limbs in a few hrs., and died in 22 hrs. Autopsy revealed no functional disturbance in any part save that a gelatinous liquid formed in the inoculated spot. An agar culture from this had like effect on another animal. The germ could not be identified. A. VORISEK.

Death of Fish in the Altmühl. A. ZSCHIESCHE. *Allgem. Fischerei Ztg.*, 35, 353–6, 373–4; *Wasser u. Abwasser*, 5, 21.—The cause of the extinction of the fish

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was due entirely to marked O deficiency which appeared after heavy rains. The decaying hay of the flooded meadows furnishes large quantities of putrescible material which consumes O. The O content was 1 to 1½ cc. per l. at the most; bacteria 20,000–50,000 per cc. When the water receded to a fairly normal condition the O rose to 4 cc. per l., the bacterial content dropping to 6,000. ARTHUR LEDERER.

Operation of the Kansas City Water Purification Plant. ANON. *Eng. Record*, 65, 188–9.—7–10.5 mil. gals. have been treated daily, using 2–4 grs. per gal. $Al_2(SO_4)_3$. The applied turbidity should be below 150 pts. per mil. for best results. If a turbidity of 6,000 pts. per mil. occurs with a settling basin full of sludge sedimentation is hindered an additional settling basin is recommended. Liberal coagulation applied at 2 points helps. Frequent flushing is required. LANGDON PEARSE.

Changes and Operating Results at the Coagulation and Sedimentation Plant of the Water Works of St. Louis, Mo. E. E. WALL. *Eng. News*, 67, 45–51.—The water is coagulated with $FeSO_4$ and CaO and settled in 8 basins; 90% of the suspended matter falls in the 1st basin. The av. amt. of suspended matter in the raw water during 1911 was 1297 pts. per mil. which was reduced to 2.9 in the purified water. The av. bacterial removal was 97.5%. CaO was reduced 52%, MgO 25%, alkalinity from 161.2 to 49.3, the color from 26.6 to 6.06 pts. per mil. $Ca(OCl)_2$ was used experimentally for a short time and applied at the rate of 8 lbs. per mil. gals. The total hardness was reduced from 193 to 108 pts. per mil. causing a reduction of 30% in the soap consumption. The av. amt. of CaO used was 5.77 and the av. $FeSO_4$ was 2.70 g. per gal. The temp. of the CaO soln. is maintained at 200° F. for the sake of thorough and continuous hydration. The cost of operation amts. to $4.755 per mil. gals. $15–$18 a day will be saved by a proposed change in the method of applying the $FeSO_4$. S. T. POWELL.

Pollution of the River Tame. JOHN D. WATSON. *Eng. News*, 67, 242–5.—The pollution by the sewage and trade wastes of Birmingham and vicinity, the immense sewage farms installed up to 1903, and abandoned for settling tanks and percolating filters, are described. Analyses of the river are given for a no. of yrs. English procedure is criticized. W. classes preventable pollution as, (1) insufficient purified domestic sewage, (2) trade wastes, (3) flushings of mill-dams in normal weather. He advocates "river boards" like the Emscher. LANGDON PEARSE.

The Chemical Purification of Drinking Water and Sewages. S. K. DSERSHGOVSKII. *Russki Wratsch*, 10, 939–42; *Wasser u. Abwasser*, 5, 23.—The common methods of purification are discussed. Bacteria in the effluents of slow English filters are less pathologic than the ones in the effluents of rapid American filters. Purification with free Cl is recommended as the simplest method. The neutral or acid reaction is required to obtain the best results. ARTHUR LEDERER.

Non-nitrification of Sewage in Sea Water. J. E. PURVIS, A. C. MCHATHIE AND R. H. FISHER. *Contract. J.*, 1911, 275; *J. Roy. San. Inst.*, 22, 442; *Sanit. Rec.*, 48, 123; *Proc. Camb. Phil. Soc.*, 16, 391; *Wasser u. Abwasser*, 5, 18–9.—After 70 days' incubation of 10% sewage in sea-water with every facility for complete aeration there was no production of nitrites or nitrates. Nitrate was formed when sewage was incubated with distilled water for 42 days. The free NH_3 increased in sewage in sea-water at the end of 42 days, but decreased in the sewage and distilled water in the same period. A. L.

Separation of Solids from Liquids with Special Reference to Sewage Purification. G. J. FOWLER. *J. Soc. Chem. Ind.*, 30, 1343–8.—F. gives the comp. of ordinary sewage as regards: (*a*) Matters in soln. (derived mostly from urin), N substances as urea, mineral salts, chlorides and phosphates; (*b*) matters in suspension, emulsion or colloidal soln. as N substances of complex character containing S (from feces), cellulose, (disinte-

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grated paper, etc.), soap and fat; (*c*) sedimentary matter as silt, sand, clay, etc. From this combination the floating matter is removed in screens, the heavy matter in catch pits, and the fine suspended solids in filter beds or sedimentation tanks. The final products of sewage purification are given, *viz.*, *gases*, as CH_4, H, N and CO_2, *sol. salts* as nitrates, phosphates, sulfates, chlorides, *insol. matter* as humus. Screening, tank-treatment, pptn. by chemical and septic tanks are discussed briefly. If it is possible to discover a kind of clotting enzyme which would do the work done on surface of filter bed a great saving in costly works would be possible. J. GAUB.

Determination of Organic Substances in Waters by Permanganate. NOLL. *Z. angew. Chem.*, 24, 1509–18.—The Kubel method is discussed and errors are pointed out. With dil. H_2SO_4 part of HNO_2 is driven off and the rest oxidized with permanganate. A correction is suggested to be applied and an example given. The use of H_2SO_4 is thought to be necessary in that it delays change of $MnSO_4$ to MnO_2 by permanganate. MnO_2 is thought to act as catalyzer in that its action becomes increased by temp., conc. of soln., excess of $KMnO_4$ and perhaps by other causes. The reduction of permanganate by organic matter takes place in acid solns. with formation of MnO_2, and with excess of reducing substance can be reduced to MnO. According to its oxidizing power permanganate must be in excess or MnO_2 ppts. and thus cuts down oxidation and causes low results. The addition of $MnSO_4$ as sometimes suggested is of no benefit because MnO_2 formed is increased. The action varies at different temps. as follows: At 60°, $5C_2H_2O_4 + 2KMnO_4 + 3H_2SO_4 = 10CO_2 + K_2SO_4 + 2MnSO_4 + 8H_2O$. At 81°, $3MnSO_4 + 2KMnO_4 + 2H_2O = 5MnO_2 + K_2SO_4 + 2H_2SO_4$. At b. the following alternated: $2MnO_2 + 2H_2SO_4 = 2MnSO_4 + 2H_2O + O_2$ and $3MnSO_4 + 2KMnO_4 + 2H_2O = 5MnO_2 + K_2SO_4 + 2H_2SO_4$. Oxidizable substances cannot be detd. by direct titration with $KMnO_4$ in b. H_2SO_4 soln. J. G.

The Destruction of House Refuse by Incineration. R. R. KNIGHT. *Can. Eng.*, 22, 257–60.—General properties of garbage are discussed. Assumes 1 lb. garbage will evap. 1 lb. water at 212° F. Temp. 2000° F. requisit. The topics covered are storage of refuse at incinerator, introduction into furnace, drying hearth, grate ash-pit and blast chamber, clinkering, furnace, boiler, regenerator, brickwork and cost, both construction and annual. LANGDON PEARSE.

The Effect of Uniformity on Distribution in Sewage Filtration. H. W. CLARK AND S. DEM. GAGE. *Mass. State Board of Health*, 1910; *Eng. Record*, 65, 121.—Comparative data are given of results with a dish plate distributor and a traveling distributor of the Fiddian type. The rotary distributor gave increased nitrification. LANGDON PEARSE.

An Outgrown Sewage Purification Plant at Madison, Wis. JAMES MACKIN. *Eng. News*, 67, 289.—A description of 2 septic tanks (200,000 gals. capac. each), 11 cinder filter beds (total area 1 1/2 acres), and a sludge bed. The plant is overloaded. Sludge is removed 3 times a year and lagooned. Analysis by Woll shows 2.23% N in very dry material. L. P.

Baltimore Sewage Treatment Plants. ANON. *Mun. J. Eng.*, 31, 755–7. ARTHUR LEDERER.

Refuse Disposal, Toronto, Ont. RUDOLPH HERING AND JOHN H. GREGORY. *Eng. News*, 67, 325–8; *Eng. Record*, 64, 740–1; *Can. Eng.*, 22, 209–10.—The choice of methods narrowed down to (1) the incineration of garbage mixed with other and more combustible refuse, with no utilization of the heat of combustion, and (2) the treatment of garbage alone by the reduction process for the recovery of grease and tankage, with the sep. incineration of combustible refuse. Elec. power sells so low that (2) was adopted. LANGDON PEARSE.

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Summary of Preliminary Report on Sewage Disposal at Cleveland, O. R. WINTHROP PRATT. *Eng. News*, 67, 276.—A statement of the conditions to-day and the costs for sewage disposal with reference to the water supply. L. P.

The Sewerage System of Nordhausen (Germany). GEISSLER. *Techn. Gem. bl.*, 1911, 96–101, 112–9; *Wasser u. Abwasser*, 5, 17–8.—Various technical details of the separate sewage systems and the character of the sewage are discussed. Treatment in Emscher tanks is contemplated. The yearly outlay 144,000 M. A. L.

Lethbridge Sewage Disposal Works. T. AIRD MURRAY. *Can. Eng.*, 22, 252–4.—An illustrated description of sewage disposal works for a town of 12,000 population, embodying a tank similar to the Emscher type, with sprinkling filters and arrangements for disinfection. The plant was built to protect a stream used for drinking water. LANGDON PEARSE.

Strathcona Hypochlorite Plant. W. M. EDWARDS. *Mun. J. Eng.*, 32, 169–70; *Water Gas Rev.*, 1912, 20–2.—A description with drawings of an emergency sterilizing plant, as well as a permanent one, for the application of $Ca(OCl)_2$. L. P.

Disinfection Plants for Small Cities. V. A. LEVASHÉV. *Russki Wratsch.*, 10, 1233–5; *Wasser u. Abwasser*, 5, 23.—The equipment ought to consist of 4 sets of app. for disinfection, and there ought to be 2 attendants. A special incinerating device is provided for the destruction of bed-straw and infected rags. Cost is $5,500. ARTHUR LEDERER.

Typhoid Fever and Mussels. C. K. MILLARD. *Sanit. Record*, 49, 92.—An outbreak of typhoid fever was traced to the consumption of mussels. F. BACHMANN.

The Detection of Light or White Dust in Certain Industrial Establishments. L. SCHWARZ. *Gesundh. Ing.*, 35, 7–9.—For the detection of white dust such as originates from gypsum mills, corn and rice mills, bakeries, mica factories, artificial stone and limestone works, Zn smelters, etc., black filters were satisfactorily employed. It was possible to perfect a color scale which gives to the presence of such dust a quant. expression. It is easy to obtain a similar scale for other white dusts. A. L.

Study of the Ventilation of Sleeping Cars. T. R. CROWDER. *J. Am. Pub. Health Assn.*, 1911, 920; see *C. A.*, 5, 2136. A. WOODMAN.

Chlorine and Sulfuric Acid in Rain Water (VITUYNII). 15. Manufacture and Application of Hypochlorite Solutions (KERSHAW). 18. Telescoping Tubes for Cultures (MONFORT). 1. Refuse Disposal (FODOR). 4. Oyster Contamination by Polluted Water (FABRE-DOMERQUE). 12. Concrete Water Mains (BAZIN). 20.

U. S., 1,017,294, Feb. 13. C. L. KENNICOTT. **Water-softening apparatus.**

Brit., 1,233, May 22, 1911. C. AHRUDSEN. **In the sterilization of liquids,** particularly milk, with the aid of ultraviolet or like rays while simultaneously cooling the liquid, the latter is frozen in the form of blocks or plates and then subjected to the action of the rays in order that by the thawing of the solidified mass the liquid may have the form of the very thin layers which are known to be suitable.

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15. SOILS AND FERTILIZERS.

F. P. VEITCH.

Alkali Lands, their Utilization and Improvement. N. M. TULAIKOV. St. Petersburg. *Rept.*, 1910.—This is a report of an agent of the Russian government in the United States on the origin and distribution of alkalies, effect on vegetation, tolerance

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of plants to alkali, utilization and methods of improving alkali soils, and use of salt water for irrigation. American literature on the subject of alkali lands is reviewed. WM. P. GARRETY.

Soils of Java. E. C. J. MOHR. *Teysmannia*, 20, 486–90, 621–31, 679–86, 757–72; 21, 79–91, 238–50, 355–64, 578–95, 638–54, 701–12, 747–52.—The soils of the region are discussed and the relation to climatic conditions. W. P. G.

Examinations of Soil Samples. V. LOMMEL AND A. PAULY. *Ber. Land u. Forstw. Durtsch-Ostafrika*, 3, 248–62.—Chemical analyses of soils near Lake Victoria Nyanza show high plant food content for the volcanic soils, low P_2O_5 and K content in the non-volcanic soils, and moderately high N content in both. W. P. G.

The Conditions of Soil Climate in Relation to the Nitrogen and Soluble Phosphoric Acid of the Soil. R. PEROTTI. *Rend. soc. chim. ital.*, [2] 2, 143–8.—This discusses the relation of climatic conditions of the soil to decomp. of organic matter, formation of humus, influence upon N supply, bacterial activity, and availability of mineral constituents. W. P. G.

The Water-raising Capacity of Soils. P. S. KOSSOVICH. *Dnevn. XII. S"iezda Russ. Est.-Isp. i Vrach.*, 634; through *Zhur. Opytn. Agron.*, 11, 734.—Expts. on the water-raising capacity of various soils as influenced by several different salts show the greatest effect with loess clay in conjunction with common salt. Salts affected the clay more than they affected the sandy soils. Rise of water was accelerated by common salt, but retarded by Na_2CO_3. W. P. G.

The Influence of Molasses on Soil Fertility. *Agr. News (Barbados)*, 9, 339; 10, 179; through *Intern. Agr., Bull. Bur. Agr. Intel. and Plant Diseases*, 1910, 230–1.—Beneficial action resulting from application of molasses as a fertilizer is ascribed to the stimulation of N-fixing organisms, and to the large K content of the molasses. Application of molasses to growing cane may do harm by destroying nitrates previously applied, or by preventing the formation of nitrates. 400 gals. to the acre gave beneficial results, but 200 gals. did not. W. P. G.

The Soil and the Plant. E. J. RUSSELL. *Sci. Prog. Twentieth Cent.*, 6, 135–52.—American hypotheses of soil fertility, especially those of the Bureau of Soils, are reviewed. R. considers soil constituents and added fertilizers of the greatest importance, and does not accept the theory that plants excrete toxins. W. P. G.

Relation between Granitic and Gneiss Soils. *Rev. sci.*, 49, 724.—In granitic soils the fine particles wash down into the subsoil, forming ferruginous organic cement (hardpan), and preventing percolation of water. Such soils are sandy, and do not retain Ca. They are apt to contain peat moors. Gneiss soils differ in all these particulars. W. P. G.

Morphological Types of Soil Formations. G. M. TUMIN. *Dnevn. XII. S"iezda Russ. Est.-Isp. i Vrach.*, 628; through *Zhur. Opytn. Agron.*, 11, 732.—Russian soils are classified from the morphological standpoint as bodies of definit organization and structure. W. P. G.

The Vineyard Soils of Switzerland. N. J. BARAGIOLA AND C. GODET. *Landw. Jahrb. Schweiz*, 25, 213–24.—Soils rich in Ca contain more suspended matter than sediment, the former being the richer in Ca. The least retentive power for water was found in soils with the most sediment. In surface as compared with subsoil, the P_2O_5 content was higher and the Ca and Mg lower, both of these increasing in the same proportion in the subsoil. More Ca was found in the rock particles than in the soil. W. P. G.

Potash in Clay and Granitic Soils. J. BARCIA Y TRELLES. *Prog. Agr. y Pecuario*, 17, 349–51, 365–6, 382–3.—Insufficiency of K detns. and necessity of field expts. to

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det. K requirements of soils are discussed. K fertilizers benefit soils derived from granits and rich in K. W. P. G.

The Loss of Ammonia from Manured Soils. P. EHRENBERG. *Landw. Ztg. Fühling's*, 60, 441–52, 479–500.—Review of various expts. shows that little or no loss of NH_3 occurs when manure is incorporated with the soil, but much loss may occur when spread on the surface. W. P. G.

Turkestan Loess. S. S. NEUSTRUEV. *Dnevn. XII. S"iezda Russ. Est.-Isp. i Vrach.*, 493; through *Zhur. Opytn. Agron.*, 11, 582.—The eolian origin of loess soils is questioned. A connection is traced between the loess and the eluvial rocks of the Turkestan mountains. Fine-grained, carbonate-carrying, yellow products of weathering are transported to the slopes by atmospheric agents. W. P. G.

Changes Induced by the Addition of Carbohydrates to Soils. H. B. HUTCHINSON AND F. S. MARR. *7th Intern. Congr. Applied Chem.*, 1909, (*Sec. VII*) 37–40; *J. Chem. Soc.*, 100, II, 430. J. J. M.

Production of Acids and Alkalies in the Soils. A. D. HALL AND N. H. J. MILLER. *7th Intern. Cong. Appl. Chem.*, 1909, *Sect. VII*, 17–8; through *J. Chem. Soc.*, 100, 429.—Expts. showed that free mineral and humus acids accumulated in soils deficient in $CaCO_3$ with long-continued application of NH_4 salts. This interfered with nitrification, and N was assimilated in the form of NH_3. Alk. reaction and puddling of the soil resulted from application of $NaNO_3$. W. P. G.

Amounts of Chlorine and Sulfuric Acid in Rain Water. I. VITUYNII. *J. exp. Landw.*, 12, 20–30 (in Russian), 30–2 (Ger. abstr.); *J. Chem. Soc.*, 100, II, 432; cf. Kinch, *Trans. Chem. Soc.*, 77, 1271.—The amts. of Cl and H_2SO_4 in rain water were estd. in monthly samples, collected in 8 different places, from April, 1909, to March, 1910. The av. amts. per mil. of rain water, and the total amts. for the yr. in lb. per acre were as follows:

	Rainfall.		Per mil.		Per acre lb.	
	Days.	Inches.	Cl.	SO_3.	Cl.	SO_3.
1. St Petersburg	225	25.41	3.56	12.21	20.53	70.37
2. Ochta	209	26.34	2.36	11.87	14.10	70.88
3. Pawlowsk	229	20.53	1.57	3.62	7.43	16.38
4. Sapolje	...	19.13	3.01	2.22	13.05	9.65
5. Smolensk	225	25.98	3.06	1.00	18.13	5.91
6. Mariupol	193	13.35	3.77	16.26	11.40	49.27
7. Tula	141	18.76	1.83	1.92	7.78	8.19
8. Borowje, Samara	124	21.30	1.95	1.06	9.42	5.13

In the St. Petersburg Government (nos. 1–4) the highest amts. of Cl occur in spring and autumn, when sea winds predominate. The results obtained at St. Petersburg, Ochta and Mariupol, indicate that the H_2SO_4 is chiefly derived from the combustion of coal and wood. J. J. M.

Lysimeter Experiments (Nitrification in Soils). S. S. PECK. Report of work of Expt. Sta., Hawaiian Sugar Planters' Assoc., *Bull.* 37, 1910; *J. Soc. Chem. Ind.*, 30, 1176; *Expt. Sta. Record*, 25, 21.—The expts. were made to study (1) the effect of various forms of Ca on the formation of nitric N in an acid upland soil from a wet district; and (2) the effect of various fertilizer salts, alone and in combination, on the formation of nitric N in a lowland soils from a dry district. The soil was placed in lysimeters, 12 being used for each soil. The tests are classified according to the nitric N produced by the various treatments, but it is understood that they do not represent and cannot supplant actual trials in the field. Working on the upland soil, rich in organic matter, poor in sol. Ca and K and acid to litmus, it is concluded that Ca added

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either as oxide, carbonate or sulfate increases the nitrification both of the soil N and of that added as $(NH_4)_2SO_4$. It also increases the amts. of Ca and K sol. in water and recovered in the drainage. $CaSO_4$ was the most effective form. The water-sol. Ca appeared to be of greater importance in controlling nitrification than the acidity of the soil. The use of phosphoric acid and K_2SO_4 produced some increase in the nitrification of $(NH_4)_2SO_4$. Working on a lowland soil containing a moderate amt. of organic matter, rich in sol. Ca salts, and alkaline to litmus, the best results in the nitrification of soil N were obtained after using double superphosphate or $Ca_3(PO_4)_2$, but a decrease in nitrification followed the use of these fertilizers when N as $(NH_4)_2SO_4$ was added. Caustic lime greatly depressed the nitric N produced from $(NH_4)_2SO_4$. Equal applications of N as $NaNO_3$ and $Ca(NO_3)_2$ produced no differences in the amt. of nitric N in the drainage in the 2 cases, but both nitrates yielded less nitric N than was obtained from an equiv. amt. of $(NH_4)_2SO_4$ and similarly less sol. Ca was present in the drainage from the nitrate applications than from the $(NH_4)_2SO_4$. In this case there was no relation between the amt. of sol. Ca and the extent of nitrification.

J. J. M.

The Influence of the Soil on Plant Growth. S. T. PARKINSON. *J. Southeast Agr. Col. Wye*, 1910, 58–261.—Expts. were made on growing carrots in peat, loam, clay, sand and chalk. WM. P. GARRETY.

Stable Manure and Green Manuring. SCHNEIDEWIND. *Ber. landw. Reichsamte Innern*, 1910, 69–77.—Comp., deterioration, and preservation of manure, and its effect on different crops are discussed. Manure should be used with com. fertilizers to obtain the best returns. In 2 yrs., about 25% of the manure N was utilized. Its beneficial effect is ascribed to its K and P_2O_5 content. Green manures gave best results on soils deficient in humus and N, and with crops of beets, potatoes, and oats. Sugar content of beets was lowered by green manures, but less so by stable manures. Green manure on potatoes gave variable results, but not so good as stable manure. Addition of $NaNO_3$ to green manure was found profitable with light soils. On all soils, K and P_2O_5 in a basal fertilizer should be combined with manure. W. P. G.

Mussel Mud as a Fertilizer. *Oil, Paint Drug Reporter*, July 10, 1911; through *J. Soc. Chem. Ind.*, 30, 970.—In most of the bays indenting the shores of Prince Edward Island are found extensive deposits (5–25 ft. deep) of mussel mud, organic remains of oysters, mussels, clams and crustaceae. The shells are found embedded in dense deposits of a mud-like substance, and this combination is a fertilizer of high value. It supplies lome and organic matter, besides small quantities of phosphates and alkalies. The shells decay slowly year by year, throwing off a film of fertilizing stuffs.

E. J. C.

The Use of Artificial and Chemical Manures (on Tea). INDIAN TEA ASSOC. *Sci. Dept. Quart. J.*, 1911, 5–14.—Fertilization of tea in Assam is discussed.

WM. P. GARRETY.

The Function of Manganese as a Fertilizer. L. BERNARDINI. *Rend. soc. chim. ital.*, [2] 2, 135–7.—A discussion and review. W. P. G.

A New Mineral Yielding Potassium Sulfate. *Engrais*, 26, 272; *Intern. Inst. Agr., Bull. Bur. Agr. Intel. and Plant Diseases*, 2, 535.—Galafatite, a mineral discovered in Almeria, Spain, on calcination and washing yields 25–30% of K_2SO_4. W. P. G.

Fertilizing Sugar Beets with Sodium Chloride. H. BRIEM. *Deut. Landw. Presse*, 38, 827–8.—Favorable results were found on substituting a mixt. of NaCl and $(NH_4)_2SO_4$ for $NaNO_3$ in fertilizing sugar beets. W. P. G.

The Formation and Decomposition of Calcium Cyanamide. M. ESCHMANN. *Diss. Tech. Hochschule Karlsruhe*, 1910.—Review. W. P. G.

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The Agricultural Value of Raw, Calcined, and Ground Mineral Phosphates. M. DE MOLINARI AND O. LIGOT. *Ann. Gembloux*, 21, 516–22; cf. *C. A.*, 5, 2294.—In pot expts. in soil and sand with oats, calcined and ground phosphates gave no increase over raw phosphate, nor over pots receiving no phosphate. The yield was increased by Thomas slag. W. P. G.

Some Fertilizer Experiments with Different Potassium Minerals. H. VON FEILITZEN. *Deut. landw. Presse*, 38, 737–8.—In expts. with barley and field peas on moor soils, feldspar and powdered aluminite gave very poor results; phonolite and nephelite gave beneficial results, but were inferior to 38% Stassfurt K salt. W. P. G.

Potash Residues as Manure. L. SAPARTOVITCH. *Khoziaistvo*, 6, 69–71; through *Intern. Inst. Agr., Bull. Bur. Agr. Intel. and Plant Diseases*, 2, 534–5.—Leached wood ashes, the residue from the prep. of potash sometime contain as high as 1% K, 1½% P_2O_5 and 20% Ca. They are therefore valuable fertilizers, especially for soils benefitted by Ca. W. P. G.

Relative Economy of Ground and Slaked Limes. R. P. WRIGHT. West of Scotland Agr. Col., *Bull.* 55, 219–21; through *Mark Lane Express*, 105, 217–21.—Properly slaked lime is more effective than ground lime, and can be as uniformly and completely distributed. W. P. G.

Manuring Experiments with Peat. A. I. DREIMAN. *Zemledielets*, 1910, No. 3; through *Zhur. Opytn. Agron.*, 11, 867–8.—Peat alone nearly doubled the yield of barley in sandy soils, but peat in combination with Thomas slag, K salts and $NaNO_3$ gave smaller yields than a complete mineral fertilizer alone. W. P. G.

The Fertilizing Value of So-called Nitrammon-lime. II. H. G. SÖDERBAUM. *K. Landtbr. Akad. Handl. och Tidskr.*, 50, 335–51.—Study of the after-effects of the fertilizer in the second season showed that its value then depends on its Ca content, the effect of P_2O_5 and N being relatively small. W. P. G.

The Use of Kelp and Rockweed as a Fertilizer. *Maritime Farmer*, 16, 623–4.—The sources and methods of using this material, which is considered a valuable fertilizer for the region, are discussed. W. P. G.

Value of Tobacco Juice Residues as Manure. *Bol. Tec. Coltiv. Tabacchi* (*Scafati*), 9, 349; through *Intern. Inst. Agr.* (Rome), *Bull. Bur. Agr. Intel. and Plant Diseases*, 1911, 65.—Analyses of the material showed dry matter 67.5%, P_2O_5 0.24%, K 0.22% and N 0.96%. W. P. G.

Lead Arsenate in Viticulture. F. MUTTELET AND F. TOUPLAIN. *Ann. fals.*, 5, 9–16.—An investigation of the effect of spraying the vines with Pb arsenate upon the Pb and As content of the wine, raisins, etc. The analytical method for As was the Marsh method preceded by soln. in HNO_3 and sepn. of the Pb as the sulfate, the latter being estd. by a colorimetric method with KI. The results showed no increase in the content of As in sprayed vines over the unsprayed. The products of unsprayed vines contained no Pb nor did the wines and piquets from sprayed vines. The leas, however, contained Pb and constituted a danger where the wine was consumed before their removal. Raisins from sprayed vines were contaminated with Pb and considered a source of danger. E. M. CHACE.

Nitrogen Fixation (PRINGSHEIM). 11C. Stimulative Action of Humus (REMY, RÖSING). 11C. Fruit Sprayed with Lead Arsenate (O'GARA). 12.

U. S., 1,016,989, Feb. 13. H. A. GALT. **Utilizing lime mud containing calcium carbonate and caustic soda in making fertilizers.**

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U. S., 1,017,581, Feb. 13. V. C. J. NIGHTINGALL. **Radioactive material combined with a phosphate fertilizer.**

U. S., 1,018,186, Feb. 20. M. M. HAFF. **Making potassium phosphate from potassium-bearing minerals.**

16. FERMENTED AND DISTILLED LIQUORS.

ROBERT WAHL.

Proposal for the Unification of Methods of Wine Analysis. ANTONIO DE GREGORIO ROCASOLANO. *Anales fac. cien., Zaragoza*, 2, 241–4.—Let wine stand 24 hrs. and make microscopic exam. of bottom portion (also of top liquor if wine has been long in repose); make organoleptic tests. Take 200 cc. sample, neutralize with Na_2CO_3, distil, and calc. alc. from d. of distillate. Det. total acidity by titration with lime water and calc. as tartaric acid from the formula $0.00409\ n - 0.000032\ n.t = At$, where n is the no. cc. used and t the temp. of the lime water and At the acidity of a 5 cc. sample. Det. ext. by evapn. at 100° and *in vacuo* at room temp. Est. volatil acidity by difference between total acidity and acidity of dry extract. Take 100 cc. wine, add boneblack, make to 150 cc. vol. and use filtrate to titrate 10 cc. Fehling soln.; calc. reducing sugars as glucose. Est. limits of K_2SO_4 by adding 1,2,3, etc., cc. standard $BaCl_2$ soln. to 10 cc. portions of wine. H. S. PAINE.

The Acidity of the Juices in the American Vines in Relation to their Resistance to Phylloxera. R. AVERNA-SACCA. *Atti del r. ist. d'incoragg. di Napoli*, [6] 1910, 153–94. —A full discussion of the subject. The work of Comes, indicating that the degree of acidity of the juices in the roots of the Am. vines bears a direct relation to their resistance to *Phylloxera*, is confirmed. F. W. SMITHER.

Analyses of the Wines of Gard and Camargue for 1909-'10. H. ASTRUC AND J. MAHOUX. *Ann. fals.*, 4, 572–8.—A discussion of the results obtained (given) upon the analysis of a large number of samples of wines of these regions. E. M. CHACE.

Wines of the 1911 Vintage. G. FILAUDEAU. *Ann. fals.*, 4, 562–9; 5, 36–44.—Résumé of analyses of wines of the above vintage, giving the max. min. and av. on alc. and acid for the following regions: Gard, Bouches du Rhone, Pyrenées-Oriental, Gironde, Cote D'Soane-et-Loire, L'Yonne, Loire-Inferieure, Vendee. E. M. C.

The Dry Extracts of the Red Wines of Burgundy. CURTEL. *Ann. fals.*, 5, 33.—The Argentine Republic demands that the French imported red wines have at least 24 g. of dry sugar-free ext. per l. The Bordeaux and Dijon Chamber of Commerce gathered data for red Burgundies for the years, 1889, 1904, 1906 and 1908. The limit of 24 g. was rarely attained for those wines. The mean value for the "Grand Vins" (Pinot) for those years were 23.08, 22.90, 23.40 and 23.20 g. ext. (dried at 100° and less total sugars) per l. For the "Vins Communs" (Gamay) the mean values for the same years were 22.36, 19.30, 19.60 and 18.00. The Burgundy wines owe their fine quality to the fact that they do not have a large amt. of extractive material. The amt. of ext. varies a great deal according to the year, and may vary on account of settling, filtering, and other mechanical operations, and is one of the least decisive elements in judging the quality of a wine. Other data are given of different Burgundies for the year 1908, in which the figures for the exts. vary from 21.1 to 25.42 g. per l.
W. C. TABER.

Possible Employment of Aluminium Vessels in Wine Manufacture. F. W. HORST. *Chem. Ztg.*, 35, 1440.—H. does not agree with Braugard (*C. A.*, 6, 664) on the use of Al vessels in wine manuf. Weak minerals acids used at a temp. somewhat higher than

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that of the cellar attack even pure Al. A 5% Al-bronze alloy was attacked less than pure Al. C. A. NOWAK.

The Treatment of Yeast with Phosphoric Acid. E. MOUFANG. *Wochschr. Brau.*, 28, 410–14, 423–4.—Phosphoric acid and phosphates were used under various conditions of time and conc. The treatment has a mechanical, disinfecting and physiological action. As it has not always given good results under practical conditions the methods given by M. based on his experimental results are of value. C. A. N.

Relation of the Albumin Content to the Color and Solubility of the Meal-body of Green Malt. G. HENNE. *Z. ges. Brauw.*, 34, 242.—Some barley varieties were found to contain a number of berries with a gray-looking body of poor solubility. From the analyses of a number of such berries compared with those possessed of a white, mealy body it was found that these had an albumin content of 12.3–14.2% while the latter contained only 10.4–11.1%. C. A. N.

New Work upon the Chemistry of Spiritous Fermentation. A. KWISDA. *Z oesterr. Apoth. Ver.*, 49, 371, 385.—A review. A. SEIDELL.

Alcoholic Beverages from Heracleum spondylium, L. C. HARTWICH. *Apoth. Ztg.*, 26, 703–6. W. O. E.

Stable Yeast Preparations. A. STEPHAN. Wiesbaden. *Apoth. Ztg.*, 26, 754–5, 764–6. W. O. E.

The Composition of a Foam-inducing Substance. K. FEIST. Univ. Giessen. *Apoth. Ztg.*, 26, 778.—The material consisted mainly of a plant extract containing saponin. W. O. E.

Malt Extract Returns, with some Remarks on the Specific Rotary Power of Wheat Starch Conversions and Brewery Worts. A. R. LING. *J. Inst. Brew.*, 17, 570–86.—The sp. rotary power of worts being calc. on the total solids may be influenced by the other wort constituents and is, therefore, of uncertain significance. To approach, as nearly as possible, practical conditions where the conversion of starch is affected below the temp. of gelatinization L. employed suspensions of wheat starch. The results were not so uniform as those obtained with starch paste. It is interesting to note that the malt of diastic power 123° Lintner gave at 130° F. products of lower reducing power than did the malt of 23°. The Lintner value appears to be an uncertain guide when taken alone as far as the starch conversions are concerned. C. A. NOWAK.

A New Method of Estimating Alcohol Vapor. A. BAUDREXEL. *Wochschr. Brau.*, 28, 21–3.—The method described by B. for estg. minute quantities of EtOH requires an absorption app. containing a soln. of $K_2Cr_2O_7$ in H_2SO_4. The alc. vapors mixed with air are passed through this soln. whereupon the alc. is immediately and completely oxidized by the chromic acid and can easily be calc. from the amt. of the remaining acid which is detd. by means of titration with an alc. soln. of known conc. C. A. N.

Materials for Floors (SCHAEKE). 20. Composition of American Grapes (ALWOOD). 12. Starch, Beet Sugar and Beer Color (DANIEL). 28. Lead Arsenate in Viticulture (MUTTELET, TOUPLAIN). 15. Dried Yeast for the Preparation of Molasses Food (FALLADA). 12.

U. S., 1,017,086, Feb. 13. H. E. DECKEBACH. **Removing alcohol from and purifying beer.**

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17. PHARMACEUTICAL CHEMISTRY.

M. I. WILBERT.

Absorbent Cellulose for Medication. E. BARONI. *Giorn. farm. chim.*, 61, 11–14.—A description of a cellulose extracted from *Pinus abies* and possessing the following characteristics and properties: The cellulose fibers are imposed one on the other, giving a soft white layer, weighing not over 15 g. per sq. m. Neutral to heliotrope (?); dissolve in cold with H_2SO_4 (1.672) and dissolve rapidly and practically completely in Schweitzer's liquid. Ash not more than 0.30%; possess absorbent power of not less than 45 and as high as 56 (method of Baroni); under action of steam compressed at 2 atm. for $^1/_2$ hr., the characteristic properties are not destroyed. Compared with absorbent cotton, muslin, etc.: Absorb. cotton is stronger, more elastic, but less absorbent, absorption number rarely exceeding 35; muslin compresses present greater analogy to cellulose, but absorption no. does not exceed 36–38. Porous cambric has absorption no. of about 25. Relative costs are given, showing cellulose to be cheaper. M. BYE.

The Alteration of Infusions of Digitalis through the Action of Microörganisms, and the Preservation of Infusions. A. HOGER. *Giorn. farm chim.*, 61, 19–20.—None of the numerous preps. made to take the place of digitalis and its infusion have proved as efficacious as infusion itself, due to fact that no other prep. contains all the active principles of the leaf. The leaves, picked in open and shipped in boxes, contain microbes, ferments, and molds, which attack infusions when made. Heating infusions for 5 min. with b. water preserves them for 4 days in ordinary flasks, 5–7 days in sterilized flasks; scalding and sterilizing at 100° produces brown-black color, and destroys part of active principles. Tinct. nux vomica, NaCl and glycerol do not prevent decomp. 0.5% $CHCl_3$ is efficacious but accentuates unpleasant taste of drug. 2–3% of alc. does not exercize great preservative effects, but 5% will keep infusions 11–35 days. A greater quantity (up to 15%) insures permanent preservation. Alc. causes cloudiness and some pptn., but activity of prep. is not impaired. It is recommended to use at least 5% alc. M. BYE.

Pencils of Carbonic Acid—their Use in Dermatology. ANON. *Giorn. farm. chim.*, 61, 25.—These pencils are obtained by means of Prana's app. 150 g. of CO_2 are compressed, under 20 atm., in a steel tube 35 cm. long. At the extremity of this tube is fixed a metal cylinder, fitted with a cotton packing. The CO_2 is allowed to flow slowly into the cylinder from a steel jacket, the perforations of which coincide with fixed points on the lid of the cylinder. A valve regulates the flow of the liquid. The snowy CO_2 forms instantly and collects on the bottom of the receiving cylinder. So obtained, the pencils are 5 cm. long, 12 mm. in diam., and weigh about 5 g. They are permanent in the air for about $^1/_2$ hr. M. BYE.

Thermal Emanations with Special Regard to the Conditions at Bad Teplitz-Schönau. PAUL ARTMANN. Reichenberg. *Z. Baln. Klimatol. Kurorthyg.*, 4, 53–7; through *Chem. Zentr.*, 1911, II, 98.—Since the amt. of Em. taken into the organism in soln. in drinking medicinal waters is very small a more favorable therapeutic effect will be obtained by inhalation methods. The conditions necessary for the most favorable use of the activity of the waters are given. A. T. CAMERON.

Hydrogen Peroxide in Ether. L. L. WALTON. *Can. Drug.*, 23, 584.—One out of 8 samples of com. Et_2O exam. contained H_2O_2. V. K. CHESNUT.

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Boroform. C. K. *Pharm. Post*, 44, 365–6.—Boroform is a condensation product of HCHO with the Na glyceroborate, $[(C_3H_5)_4(H_2BO_3)_2(HNaBO_3)_2(OH)_3O_2]_2.CH_2$. It gives the usual tests for B, glycerol and CH_2O, m. 153–4°, d. 1.150. Stable in conc. soln. but breaks up readily with H_2O into glycerol, $Na_2B_4O_7$ and CH_2O. The CH_2O comes off in the nascent condition. The deposit formed in boroform in cold weather is a polymerization, not a decomp. product. V. K. CHESNUT.

Lixicidic Action of Papain and of the Latex of Ficus carica. CLAUDIO FERMI. Univ. Sassari. *Arch. farm. sper.*, 11, 360–3.—Papain and latex of fig destroy the activity of fixed virus. This effect is not due to the proteolytic enzyme, inasmuch as the destructive action persists after inactivation of the enzyme by heat, and proteolytic enzymes from other sources are without effect. A. W. DOX.

Methods of the German Pharmacopeia. V. W. STUEWE. Univ. Jena. *Apoth. Ztg.*, 26, 677.—This paper describes procedures for detg. the m. p. and I no. of fats and similar substances. W. O. EMERY.

The Production of Menthol in Germany and the German Colonies. H. THOMS. Univ. Berlin. *Apoth. Ztg.*, 26, 686–7.—The oils obtained (cf. *C. A.*, 5, 1493) were found to contain 74 and 78.8% menthol. Plants from the same source, sent to German East Africa and Southwest Africa for cultivation, yielded an oil containing 84.8% menthol. W. O. E.

Examination of Spiritus Aetheris Nitrosi According to the German Pharmacopeia. V. R. GAZE. Marburg. *Apoth. Ztg.*, 26, 689. W. O. E.

The Polyhydrosulfides of Brucine. D. BRUNS. *Apoth. Ztg.*, 26, 701–2.—The compd. prepared by O. Doebner by the action of $(NH_4)_2S_x$ on an alc. soln. of brucine (*Arch. Pharm.*, 1894, 693) and by him believed to have the comp.: $2C_{23}H_{26}N_2O_4.H_2S_8.2H_2O$ was shown by B. to be constituted as follows: $3C_{23}H_{26}N_2O_4.2H_2S_6$, or identical in every way with the product obtained by E. Schmidt (*Ann.*, 180, 296) by the action of H_2S on an alc. soln. of brucine in the presence of atmospheric O. W. O. E.

Spiritus Aetheris Nitrosi. K. ENZ. *Apoth. Ztg.*, 26, 717–9.—Tabulated data covering the exam. of 11 samples of this product are reported. W. O. E.

Arsenic Triiodide. ERW. RICHTER. *Apoth. Ztg.*, 26, 728–30, 742–3. W. O. E.

Applied Plant Microchemistry. III. The detection of esculin by means of microsublimation, especially in the diagnosis of rhizoma gelsemii, with remarks on the anatomy of these drugs. O. Tunmann, Bern. (*Apoth. Ztg.*, 26, 812–4; cf. *C. A.*, 5, 1494, 2695). W. O. E.

The Estimation of Morphine in Opium. H. WIEBELITZ. Braunschweig. *Apoth. Ztg.*, 26, 824. W. O. E.

Plant Drugs of South Germany. L. ROSENTHALER. Univ. Strassburg i. E. *Apoth. Ztg.*, 26, 885–9. W. O. E.

Arrow Poisons. ADLUNG. *Apoth. Ztg.*, 26, 898–9. W. O. E.

The Testing of Lecithin. SIEDLER. *Apoth. Ztg.*, 26, 912; Sattler, *Ibid.*, 930; Salzmann, *Ibid.*, 949. W. O. E.

Antiseptic Mercury Soaps. WALTER SCHRAUTH. Berlin. *Apoth. Ztg.*, 26, 913–4. W. O. E.

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The Necessity for the Microscopical Examination of Powdered Drugs. LUDWIG KROEBER. Munich. *Apoth. Ztg.*, 26, 920–1. W. O. E.

The Nicotine Content of German Tobacco and the Distribution of Nicotine in the Tobacco Plant. R. GAZE. Marburg. *Apoth. Ztg.*, 26, 938–9.—The results of the investigation show that the alkaloidal content of *Nicotiana* plants varies in individuals of the same race, not only in the leaves but in the stock as well; further that the crown contains less alkaloid than other parts of the stock. W. O. E.

Chininum Tannicum Venale. G. FRERICHS. Bonn. *Apoth. Ztg.*, 26, 976–7. W. O. E.

The Relationship Existing between the Drop Number and Yield of Extract in the Percolation Method. LUDWIG KROEBER. Munich-Schwabing. *Apoth. Ztg.*, 26, 978; H. WIEBELITZ, *Ibid.*, 1001; H. LINKE, *Ibid.*, 1021. W. O. E.

Hydrogenium Peroxydatum (Deutscher Apotheker-Verein). LUDWIG KROEBER. Munich-Schwabing. *Apoth. Ztg.*, 26, 995. W. O. E.

Inferior Acetylsalicylic Acid Tablets? H. LINKE. Berlin. *Apoth. Ztg.*, 26, 1000. W. O. E.

The Detection of Salicylic Acid in Aspirin and Acetylsalicylic Acid. K. ENZ. *Apoth. Ztg.*, 26, 1009. W. O. E.

Plant Drugs of South Germany. STURM. *Apoth. Ztg.*, 26, 1019. W. O. E.

The Detection of Salicylic Acid in Acidum Acetylosalicylicum D. A.-B. V. H. MELZER. Meiningen. *Apoth. Ztg.*, 26, 1033.—M. was able to detect salicylic acid in diln. 1 : 100000 by the aid of $FeCl_3$. The presence of Na phosphate, borax or tartaric acid tends to mask the color test. W. O. E.

Preparation of a Purified Extract of Cascara Sagrada. AD. DIEFFENBACH. Bensheim (Hessen). *Apoth. Ztg.*, 26, 1046. W. O. E.

Liqior Aluminii Acetici. D. SCHENK. Crefeld. *Apoth. Ztg.*, 26, 1056. W. O. E.

Do Aspirin Tablets Contain no Salicylic Acid? LINKE. Berlin. Staedt. Krankenhaus., Friederichshain. *Apoth. Ztg.*, 26, 939.—Reply to Seel and Friederich. L. is convinced, as the result of numerous expts., first, that free salicylic acid may be detected in acetylsalicylic acid tablets including the aspirin brand, when treated, not only in water suspension, but also in alc. soln. with subsequent addition of water, with $FeCl_3$; second, that aspirin tablets as such, as also all acetylsalicylic acid tablets contain free salicylic acid. Friederich replies (*Ibid.*, 986). Reply by Linke (*Ibid.*, 994). W. O. E.

The Stability and Sensitiveness of the Ferric Chloride Reaction as Applied to Salicylic Acid, together with an Attempt to Utilize this Reaction in Estimating Free Salicylic Acid Colorimetrically in Aspirin and all other Acetylsalicylic Acid Tablets. H. LINKE. Berlin. *Apoth. Ztg.*, 26, 1083–4.—The author has continued his expts. with different brands of acetylsalicylic acid tablets to det. approximately the amt. of free salicylic acid occurring therein, utilizing for this purpose the intensity of coloration produced by a soln. of $FeCl_3$ of definit strength. The procedure consists in allowing the tablet to disintegrate in a little water, the soln. increased to 25 cc., shaken, 1 drop of a soln. $FeCl_3$ (in the proportion of 1 + 24 dil. liquor ferri sesquichlorati) added, again

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shaken, then filtered into a test tube 20 mm. in diam. The color was compared with that of a series of similar test tubes each containing 25 cc. water, 1 drop $FeCl_3$ soln. of above noted strength, and amts. of salicylic acid varying in conc. from 1 : 50,000 (in increments of 10,000 water up to 100,000, from which and up to 1 : 200,000 the concs. varied by 20,000) to 1 : 200,000. All brands of acetylsalicylic acid, including aspirin, in tablet form contain free salicylic acid, never more however than $^1/_2$ mg. per 0.5 g. tablet. Even in a diln. as high as 1 : 900,000 salicylic acid may be detected. Cf. preceding abstr. W. O. E.

Germ-proof Containers and New Surgical Dressings. ERNST KUHLMANN. Berlin. *Ber. pharm. Ges.*, 21, 298–302.—Attention is directed particularly to parchment as a material superior in many ways to metal, glass and paper for coverings and containers of surgical dressings. W. O. E.

The Further Development of the Microsublimation Method and the Identification of Arbutin in Plants. O. TUNMANN. Bern. *Ber. pharm. Ges.*, 21, 312–9.—30–50 mg. powdered substance are moistened with 2–3 drops dil. (1 : 10) HCl on an object glass placed on an asbestos plate, the latter 50 mm. above the base of an alc. flame 10 mm. high. Time of heating about 5 min. Cleavage and other products sublime onto a second object glass elevated 3 mm. above the first and are subjected subsequently to a microchemical exam. In 4 plants (*Arctostaphylos uva ursi* Sprengel, *Vaccinium myrtillus* L, *Kalmia angustufolia* L and *Pirola rotunditolia* L), T. was able to identify hydroquinone, from which he concludes that arbutin was originally present in the plant tissues. W. O. E.

Medicinal and Economic Plants of Brazil. TH. PECKOLT. Rio de Janerio. *Ber. pharm. Ges.*, 21, 346–67; cf. *C. A.*, 5, 3324.—Two papers describing the 2 families, Bignoniaceae (31 genera with 168 species and varieties) and Caryocaraceae (9 genera). W. O. E.

The Chemical Nature of "Vasotonin" Solution. FRANZ MUELLER. Berlin. *Ber. pharm. Ges.*, 21, 408–18. W. O. E.

The Chemical Nature of Vasotonin Solution. L. SPIEGEL. Charlottenburg. *Ber. pharm. Ges.*, 21, 578–81.—Response by L. GRUENHUT, Wiesbaden (*Ibid.*, 21, 581–2). W. O. E.

Reaction of Calomel with Quinine and other Alkaloids. E. BARONI AND O. BORLINETTO. *Giorn. farm. chim.*, 60, 241–4; through *Chem. Zentr.*, 1911, II, 392.—When equal parts of moist Hg_2Cl_2 and quinine dihydrochloride or dihydriodide are rubbed together, a brown coloration appears at once. A yellow coloration is formed with quinine hydrochloride or hydrobromide, with ethylquinine hydrochloride or the HCl–H_2SO_4 double salt of quinine. Similar reactions are given by hydrastine hydrochloride upon addition of water; heroin hydrochloride, with addition of EtOH; pilocarpine without solvent; cocaine, when Et_2O is added; dil. EtOH brings out the color change in the case of heroin. Uncombined quinine does not give the reaction. H. M. LANCASTER.

Digitalis Preparations Employed in Medicin (Critical Review). W. E. DIXON. *Quart. J. Med.*, 5, 297–307. J. H. MITCHELL.

Terpene- and Sesquiterpene-free Ethereal Oils. G. MOSSLER. *Z. oesterr. Apoth. Ver.*, 49, 549.—An address. A. S.

Testing Non-official Preparations. K. SCHUSTER. *Z. oesterr. Apoth. Ver.*, 49, 27–33; cf. *C. A.*, 5, 1319.—Description tests, etc., are given for the following compds.:

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monoiodobehenic acid (sajodin), codeine bromomethylate (eucodine), morphine bromomethylate (morphosan), novaspirin, iothionum, alypinnitrate, salicyl aldehyde methylphenylhydrazone. A. SEIDELL.

Estimating Alcohol Vapor (BAUDREXEL). 16. Determination of Pepsin and Trypsin (WALDSCHMIDT). 11B. Fagaramide, a New Substance (THOMS, THÜMEN). 10.

U. S., 1,016,977, Feb. 13. H. THRON, E. SPRÖNGERTS and C. FREUND. **Carbamic ester of tertiary amyl alcohol.**

U. S., 1,017,261, Feb. 13. A. HEMPEL. **Making formates.**

U. S., 1,017,269, Feb. 13. L. SEAGO and A. SEAGO. **Hair dye.**

U. S., 1,017,560, Feb. 13. A. KLEIN. **Making a derivative of cantharidic acid containing iodin and mercury.**

U. S., 1,017,595, Feb. 13. W. H. ROYSTONE. **Toilet cream.**

U. S., 1,017,657, Feb. 20. P. EHRLICH and A. BERTHEIM. **Arseno-benzene derivatives.**

U. S., 1,017,669, Feb. 20. A. HESSE. **Solutions of perfumes in phthalic esters.**

U. S., 1,017,699, Feb. 20. F. STOLZ. **1-*p*-Dimethylaminophenyl-3,4,4-trimethyl-5-pyrazolone.**

U. S., 1,018,092, Feb. 20. L. W. ANDREWS. **Making oxalates.**

U. S., 1,018,240, Feb. 20. R. VON FOREGGER. **Greaseless cosmetic paste containing a solid peroxide and glycerol.**

U. S., 1,018,329, Feb. 20. L. LILIENFELD. **Making sulfur derivatives of glycerol from halohydrins containing at least one hydroxyl group and inorganic sulfides.**

Brit., 12,329, May 22, 1911. J. SORLEY. For the **destruction of insects**, a comp. contg. xylene 2 ozs. 6 drachms, soft paraffin 1 oz. 3 drachms, S 16 grains.

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18. ACIDS, ALKALIES, SALTS AND SUNDRIES.

T. LYNTON BRIGGS.

Sulfuric Acid Manufacture in Tennessee. W. A. NELSON. *Mining Sci.*, 65, 149–51.—A by-product industry as an incident to Cu smelting. E. J. C.

The Manufacture of Chemically Pure Hydrochloric Acid. ANON. *Chem. Eng.*, 14, 461.—A description of the general com. method for the manuf. of HCl from NaCl and the process of purification by redistillation. The method of conc. of the acid from sp. gr. 1.10 to 1.19 entails some loss. Accumulation of impurities in the still is prevented by an overflow. Strong acid is fed into the still from a supply tank. Three cuts are given to illustrate features of the processes. W. W. SCOTT.

Uses of Bakelite for Acid-proof Linings and other Chemical Purposes. ANON. *Met. Chem. Eng.*, 10, 53.—Methods for using 2 varieties of liquid bakelite "A 10" and "A 15" are given. Asbestos, finely ground, wood flour, ground cork, silex, etc., are used as fillers. The resulting paste applied to surfaces and baked at a moderate temp. hardens and it is claimed forms an acid-resisting coating. W. W. SCOTT.

The Manufacture of Fine Soda. J. PARDELLER. *Seifenseider Ztg.*, 39, 49–51.—By fine soda is meant small crystals of $Na_2CO_3 + 10H_2O$. There are 2 methods: One is to add 100 parts Na_2CO_3 to 200 parts warm H_2O and then to stir until the soln.

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begins to show crystals, when 20 parts more of Na_2CO_3 are added and stirring continued until a dry powder results. The second method depends upon the fact that rapid cooling of a satd. soln. of Na_2CO_3 will give micro-crystals. These crystals are then drained or centrifuged. E. SCHERUBEL.

Apparatus for the Manufacture of Ammonia from Ammonium Sulfate. R. W. HILGENSTOCK. *Chem. Eng.*, 15, 20.—The process depends on the action of $Ca(OH)_2$ on $(NH_4)_2SO_4$ and subsequent distiln. of the NH_3 vapors. The stills in design are like those used in the distiln. of NH_3 from gas liquors. The oily particles are removed by passing through layers of heavy tar or mineral oils; to remove impurities and obnoxious odors the gas passes through 2 wrought Fe cylinders filled with charcoal and boneblack. Quadruple absorption of the NH_3 vapors is effected by means of 2 absorbers of 2 compartments each. When the absorbing liquors reach a d. of 0.910 they are drawn off into drums. The construction and arrangement of the absorbing app. is designed so that a product 33% NH_3 can be made without loss of NH_3, provided sufficient cooling water can be used, having a temp. of about 18°. 4 cuts of the plant are given. E. C. LATHROP.

Recent Progress in the Manufacture and Application of Hypochlorite Solutions for Bleaching and Disinfecting Purposes. J. B. C. KERSHAW. *J. Soc. Chem. Ind.*, 31, 54–7. E. J. C.

Calculations of Vacuum Pans. B. VIOLA. *Met. Chem. Eng.*, 10, 31.—V. works out by a number of formulas for the efficiency of vacuum pans beginning with the single effect and later dwelling upon the quadruple system. The article is subdivided as follows: Single effect, design of tartaric acid evaporators, design of quadruple effect, design for quadruple effect for recovery of K_2CO_3 from wool waste liquor, quantities of water to be evapd. in the different bodies, radiation and convection heat losses, heat consumption of different bodies, self evapn., calcn. of heating surfaces, calcn. of connecting pipes. A number of useful formulas are given. W. W. SCOTT.

The Manufacture of Headless or Baryta Safety Matches. O. ROUTALA. *Z. angew. Chem.*, 25, 14.—The bundles of splints are dipped about 4–5 mm. deep into a conc. soln. (d. 1.46–1.5) of the chlorides of Ba, K, and Cu in suitable proportion to give a colorless flame. The largest parts of the soln. is made up of $BaCl_2$. The $CuCl_2$ is made directly from $BaCl_2$ and $CuSO_4$. The bundles remain about 20 sec. in soln., and are then dipped into a 2nd soln. of hot water and a little H_3PO_4 or NaH_2PO_4 to a depth of 5–7 mm. for 8–10 sec. They are dried in a special drying chamber with forced draft of hot air in 1 hr. For finishing, the matches are dipped into a soln. of $KClO_3$ and $K_2Cr_2O_7$ and a little coloring material, and are dried in a warm room. The matches are struck by rubbing on a surface containing P. Advantages: They are put up with more in a box than the ordinary Swedish match, and are 20–25% cheaper. Disadvantages: (1) Disagreeable odor on burning, (2) uncertain burning and (3) strong afterglow; (4) in the dark one does not know which end of the match to strike.
E. C. LATHROP.

Mineral Wastes: The Chemists' Opportunity. CHARLES L. PARSONS. *J. Ind. Eng. Chem.*, 4, 125–31; *Mining Eng. World*, 36, 447–9.—A lecture. E. J. C.

Sickness Statistics for the Chemical Industry for 1909–'10. BRAUER. *Chem. Ind.*, 34, 693–8. E. J. C.

Action of Air upon Lime (LEVI, ORTHMANN). 29.

U. S., 1,017,032, Feb. 13. J. W. AYLSWORTH. **Composition for phonograph records.**

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U. S., 1,017,593, Feb. 13. C. ROLLIN. **Making amorphous anhydrous barium hydroxide.**

U. S., 1,017,776, Feb. 20. H. S. LEVY. **Making electrotypes.**

U. S., 1,017,949, Feb. 20. M. BRESLAUER. **Extinguishing fires with aluminium chloride solution.**

U. S., 1,018,255, Feb. 20. G. E. MILLER. **Sulfur burner.**

Brit., 12,008, May 18, 1911. A. KLAGES, *et al.* A product for yielding **hydrogen peroxide,** consisting of a mixt. of a crystallized perborate which has not been partially or wholly dehydrated, such as crystallized Na perborate, with a Na salt of a sulfobenzoic **acid.**

Brit., 14,633, June 20, 1911. CARL RUPPEL. Preventing the entrance of quenching water into the piping of protected **receptacles for inflammable liquids.**

Ger., 230,167, May 11, 1910. A. WERNICKE. Preliminary **drier** for salts and other chem. products obtained by continuous process. In a vertical hollow cylinder perforated through its lower part a conical partly perforated hollow revoluble cylinder, with worm conveyors, is disposed. The hollow cylinder is surrounded with a jacket. Through openings outside air has access to the interior.

Ger., 231,271, Feb. 18, 1910. E. HAGEMÜLLER. In the **precipitation of the clarifying agent from the treated liquid,** the enclosing of the clarifier by gas bubbles is prevented by an oscillatory motion imparted to the liquid by means of a globe suspended in the vessel and connected with a siren tuned to the globe.

19. GLASS AND CERAMICS.

G. E. BARTON, A. V. BLEININGER.

The Burning Temperature of Limestones. A. V. BLEININGER AND W. E. EMLEY. Bureau of Standards. *Trans. Am. Ceram. Soc.*, 13, 618–38 (6 curves); cf. *C. A.*, 5, 3714.—$CaCO_3$ dissociates at 898°; therefore limestone need not be burned above 898° if time, etc., could be disregarded. Small cylinders of powd. limestone, with a hole running from one end to the center, were heated in an elec. furnace. Two thermocouples were used, one placed in the hole in the sample, the other beside the sample. The heating was so regulated that the 2nd couple showed a straight line time-temp. curve. The curve of the couple inside paralleled it until dissociation occurred, when it lagged. All samples showed lag (dissociation) at 880° regardless of differences in phys. structure. Johnston's detn. of 898° was made with more refined instruments. With magnesian limestones, $MgCO_3$ showed dissociation lag at about 750°—more variable than the $CaCO_3$ point. The max. burning temp. for any limestone is limited by its comp.—in general, the greater the SiO_2, Fe_2O_3 and Al_2O_3 the lower the temp. at which softening and subsequent contraction takes place. The same samples were burned in a gas-fired kiln to 800, 900, 1000, 1050, 1100, 1200 and 1300° and the rate of hydration of each was detd. by the use of a calorimeter. Thus the max. permissible burning temp. was detd. for (*a*) pure, high CaO stones, above 1300°; (*b*) impure, high CaO stones, 1050–1150°; (*c*) pure magnesian stones, 1000–1050°; (*d*) impure magnesian stones, 900–1020°. The sp. gr. and porosity of limes burned to various temps. were detd. Pure limes gained in d. as the burning temp. was increased. Impure limes gained until the impurities and the CaO formed silicates, aluminates and ferrates after which they lost as the temp. was increased. Thus the purity was shown by the temp.-d. curve. In the porosity-temp. curve the porosity increased until all CO_2 was expelled, then decreased as the impurities were taken into combination. The

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steeper the curve with increase in temp. beyond max. porosity, the narrower the burning range allowable. C. H. KERR.

The Possible Industrial Application of Certain Clays of Montescaglioso. L. PARLATI. *Atti del r. ist. d'incoragg. di Napoli*, [6] 1910, 289–96.—*The Clay of Fontana of Garzo* is yellow and sandy, does not contain organic matter or hydrated SiO_2, contains but little SO_3, 26% $CaCO_3$, 4% $MgCO_3$, about 4% Fe_2O_3, 32% sand, about 22% hydrated Al silicate. It is used for the manuf. of bricks and tiles. *Zoppo dei Nuvoli clay* is grayish white and tenacious, free from organic matter and hydrated SiO_2, contains very little SO_3, 21.53% $CaCO_3$, 3.57% $MgCO_3$, about 4% Fe_2O_3, 28% sand, about 35% hydrated Al silicates and is used for the manuf. of jugs, etc. *Montevetere clay* is yellow-white and very tenacious, free from organic matter, and hydrated SiO_2, contains very little SO_3, about 18% $CaCO_3$, 2.5% $MgCO_3$, about 5% Fe_2O_3, 16% sand, and more than 40% hydrated Al silicate, is very plastic and is used for the manuf. of vases and porous objects. These clays are not suited for porcelain or fine ware, but by preliminary mechanical treatment and treatment with dil. HCl, they may be used in admixtures with other clays for the production of high grade ware. F. W. SMITHER.

English Kaolin and its Uses. N. CHERCHEFFSKY AND J. MALARSKI. *Rev. gén. chim.*, 15, 3–11, 31–6. E. J. C.

U. S., 1,017,360, Feb. 13. D. A. YORK and J. A. TINKER. **Enameling steel, etc.**

U. S., 1,017,391, Feb. 13. H. L. DIXON. **Glass-pot furnace.**

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20. CEMENT AND OTHER BUILDING MATERIALS.

C. N. WILEY.

The Constitution and Formation of Portland Cement. M. E. LEDUC. *Bull. soc. encour.*, 116, 280–321; *Ciment*, 17, 2–5.—A review of the work on constitution from Bergman to Keiserman (*C. A.*, 5, 1328). After preparing the various silicates, aluminates and ferrites a series of mixes corresponding to $3CaO.SiO_2 + 2CaO.Al_2O_3$, in which Al_2O_3 or Fe_2O_3 varied from 2 to 10 pts. per 100 of $3CaO.SiO_2$ were burned and in every case a pulverizing product was secured. By lowering the CaO from 3 to 2.8, from 6 to 10 pts. per 100 of Al_2O_3 or Fe_2O_3 stable products were secured which, however, were not tri-Ca silicates on account of the CaO combined with Al_2O_3 (cf. Jänecke, *C. A.*, 6, 673). The substitution of Fe_2O_3 for Al_2O_3 made no difference in the dusting, which increased with increase in the size of the sand or clay grains. A further study was made of the compd. $2.6CaO.SiO_2 + \begin{cases} 2CaO.Al_2O_3 \\ 2CaO.Fe_2O_3 \end{cases}$, in which the Al_2O_3 and Fe_2O_3 were varied from 0 to 4 pts. per 100 of the silicate. The introduction of Fe_2O_3 gave lower strengthed cements, the decrease following the increase in Fe_2O_3 (cf. *C. A.*, 4, 3126; 6, 280–1). Increasing % of Al_2O_3 also caused a falling in strength, but there was no dusting even with 28% Al_2O_3 provided the raw materials were sufficiently fine. Cements made with a max. of 24% of clay require 1400–1450° for proper burning and a decrease in clay requires an increase in temp. A cement containing 24.93% MgO the latter being substituted for part of the CaO, hardened well but failed in the b. test. A. J. PHILLIPS.

The Colloidal Properties of Cement. P. ROHLAND. *Cement*, 16, 221–3.—Two changes occur during the setting and hardening of cement: (1) formation and coagulation of the colloidal matter, (2) sepn. and carbonation of $Ca(OH)_2$. (2) is the cause of the non-oxidation of the steel reinforcing. (1) is the cause of plasticity, dilatability, fire-resistance and impermeability of cement. The adhesion of concrete to steel which

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may rize to 40–47 kg. per cm. is due to the formation and coagulation of the colloids on the steel. Impermeability depends on the filling of the voids and not more than 50% mortar is necessary with a properly graded aggregate. Fire resistance is due to the poor conduction of both the colloids and the addition of sand, gravel, etc., and reaches a maximum when all the colloids have coagulated. A. J. PHILLIPS.

The Constitution of Portland Cement. E. WETZEL. *Mitt. kgl. Materialprüfungsamt*, 29, 355–9.—Details, diagrams and photomicrographs of *C. A.*, 5, 2317. A. J. PHILLIPS.

Tests of Concrete for Shrinkage and Contraction. A. T. GOLDBECK. *Eng. Record Suppl.*, 65, 65; cf. *C. A.*, 5, 3506.—In a 1 : 2 : 6 concrete the coeff. of shrinkage in set is 0.00068 while that for change in temp. is 0.000005. Hence 121° of temp. is necessary to cause the same contraction as results from loss of H_2O. Concrete is affected by moisture in the same way as timber, which causes a tendency to shear between the top and bottom course in concrete pavements. It is also suggested that steel may be affected by fatigue due to repeated strains caused by the alternate wetting and drying of concrete. A. J. PHILLIPS.

The Contraction of Plain and Reinforced Concrete. MESNAGER. *Ciment*, 16, 211–2.—A comparison of the results of Goldbeck (*C. A.*, 5, 3506) and those of the Nat. School of Bridges and Highways. The former found 0.05% at 3 mo. and the latter 0.04–0.045% at 3 mo. and 0.05–0.055 at 5 mo. A. J. PHILLIPS.

Destructive Action of Butter Oil on Concrete. W. M. BRODE. *Eng. News*, 67, 257.—Leakage from tanks of aërated melted butter disintegrated concrete girders with which it came in contact, giving the aggregate the appearance of sand satd. with grease. A. J. PHILLIPS.

Proportioning Gravel Concrete. C. OLDER. *Eng. Record*, 65, 122–4.—The complete specifications and diagrams for vol. proportioning are given. A. J. P.

The Limiting Proportions of Concrete for Reinforced Concrete Construction. O. MARKUS. *Zement u. Beton*, 10, 42–3.—Quoting from the Proc. Ger. Concrete Assn. the strength of concrete is in general proportional to the cement content, a 1 : 5 mix being double a 1: 10, the min. being 1: 4. The compressive strength where the height is the lowest dimension, is inversely proportional to the height. A. J. P.

The Consistency of Concrete. ANON. *Eng. Record*, 65, 185.—(1) It is inadvizable to lay down any definit rule as to the % of water to be used. (2) Apart from reinforcement the strength of concrete increases with decrease in the amt. of mixing water, particularly during the early stages of hardening. (3) In reinforced concrete the mix should be wetter than otherwise might be desirable in order that the bars may be entirely surrounded. (4) The drier the concrete the quicker the set, which is important where there is danger from frost. (5) The wetter the concrete the greater the tendency to contract, which may last several yrs. (6) If any degree of "wetness" is specified it should be after mixing so that no limit can be placed on the water content, owing to atm. temp. aggregate, etc. A. J. PHILLIPS.

Concrete Water Mains. M. E. BAZIN. *Eng. Record*, 65, 154.—Satisfactory results have been secured in Cologne and Stettin with concrete mains, with regard to taste of water and impermeability of the pipes. P. or slag cement may be used, the latter being especially valuable under water or in wet ground. Argillaceous and calcareous sands for the aggregate are to be avoided, a siliceous river sand being preferable. A. J. PHILLIPS.

Analysis of a Pozzuolana. O. REBUFFAT. *Atti del r. ist. d'incoragg. di Napoli*, [6] 1910, 147–50.—The exam. of a sample from the Canneto Cave at Bacoli. The sample was of clear gray color with the physical characteristics of fine trachytic poz-

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zuolana. The fine part and the coarse part have the same comp. and behave alike toward HCl and do not differ notably from other pozzuolanas of the same region. Compared with that from the Salemme Cave with 30% sol. in HCl, the sample has 45%, though higher in SiO_2. SiO_2: Al_2O_3 for the Canneto is 3 in the sol. and in the insol., but in the Salemme is 1 in the sol. part and 5 in the insol. part. The changes in comp. due to atmospheric and other agencies are discussed and the variations in the proportion attached by HCl as a result of same. F. W. SMITHER.

Tests of Concrete Slabs. S. M. DIXON AND P. W. VILLIERS. *Eng. Record*, 65, 151.—If the strength of plain concrete supported on 2 edges with conc. load is taken as 1, then the strength with uniform load is 2, with conc. load on 4 edges strength = 2 and with uniform load = 4. With variations in the thickness tested on 4 edges the transverse strength varies approx. as the sq. of the thickness. The strength of reinforced slabs varies with the kind of reinforcing. A. J. PHILLIPS.

Control-beam or Test Cube for Concrete Testing. E. SCHICK. *Zement u. Beton*, 10, 65–7.—Discussion of the 2 methods, concluding that only in few cases is the former superior. A. J. PHILLIPS.

Electrical Resistance of Plain Concrete and its Constituents. O. BERNDT AND W. MÜLLER. *Oeffent. Ausschusses Eisenbeton*, 1911, No. 6; through *Zement u. Beton*, 10, 226.—Concrete specimens stored in air, moist sand, pure and sea H_2O, and artificially dried at 100°, were tested to det. the effect of H_2O content, the resistance and and the resistance curve due to variations in the current flow. The conclusions were: (1) the leaner the mixt. the greater the resistance for air-stored samples, (2) the resistance for plastic concrete varies according to the dampness of the sand, (3) by drying the resistance at first low becomes higher. A. J. PHILLIPS.

The Influence of Sodium Phosphate and Borate on Portland Cement. O. KALLAUNER. *Beton u. Eisen*, 11, 49–50.—Concrete specimens mixed with and stored in Na phosphate soln. show a greater strength both in compression and tension up to 90 days than in pure water. The increase is greater with increase in the PO_4 ions in soln., depending on the Na salt employed. An insol. Ca phosphate is formed which not only quickens the set but which prevents the soln. of CaO on storage, giving hard, dense specimens. Na borate has a very small influence on the strength, forming a Ca borate which fills the pores, but which also absorbs water of crystn., increases in vol., and weakens the cohesion of the mortar. With increase in conc. of the Na borate the cement strength declines. A. J. PHILLIPS.

Fire-resisting Concrete. H. G. HOLT. *Concrete Constr. Eng.*, 7, 13–23.—Comparisons of fire behavior of concrete and tile are made, showing the causes of failure in the latter. The chief advantage of concrete is in its equal expansion with steel (cf. *C. A.*, 1, 90; 4, 776). Thermal cond. depends largely on the aggregate used. Tests by the British Fire Prevention Comm. were made on coke-breeze, burnt ballast, furnace slag, broken brick, furnace clinker, broken granit and Thames ballast. The fire was maintained at 1000–1200° for 3 hrs., followed by the application of H_2O for 2 min. and the materials were valued in the order named. The conclusions point out the excellence of coke-breeze concrete and the necessity of about 2 in. protection for steel reinforcement. In all tests (1) a rich mix proved better than a lean one, (2) a wet mix was better than a dry, (3) aggregates broken in small pieces proved better than those not passing a $^3/_4$-in. ring. Gravel and ballasts are unsuitable (cf. *C. A.*, 3, 2212). Before concrete will disintegrate under fire exposure the 20–25% combined H_2O must be vaporized and driven from the pores in order that the concrete may become hot enough to crumble. This dehydration may be still further prevented by washing the concrete with Na silicate soln (see *C. A.*, 5, 2320). A. J. PHILLIPS.

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A Survey of the Concrete Aggregates of Wisconsin. M. O. WITHEY. *Concrete*, 12, 55–60.—Description of phys. tests with photos. A. J. PHILLIPS.

Sawdust Concrete. ANON. *Cement Eng. News*, 24, 8.—Was used as a base for a cork carpet in the Pub. Library, Springfield, Mass. A 1–2–$^3/_4$ mix. was found best. It is of light wt., low tensil strength, very elastic, and holds nails well. A. J. P.

Resistance of Reinforced Concrete to Explosives. ANON. *Eng. Mining J.*, 92, 105; through *J. Soc. Chem. Ind.*, 30, 958.—The extraordinary resistance of reinforced concrete to violent shocks has been demonstrated by various explosions. E. J. C.

The Manufacture of Portland Cement from Furnace Slag. H. KÜHL. *Chem. Ztg.*, 35, 1386–7.—In contradiction to R. S. Huey (*C. A.*, 5, 3506), K. states that: (1) the physical condition of the slag before burning is unimportant; (2) if granulation is practiced the dry method is preferable; (3) sprinkling of clinker with water is not to hydrate quicklime, which is never present in a propefly burned and prepared clinker, but to further an only partially understood lengthening of the setting time of quick-setting cement; (4) the danger of injurious effects in Portland cement making from S as sulfide in the slag is negligible. A. D. DUNBAR.

Mixtures of Cement and Hydraulic Materials for Floors of Wet Cellars. SCHAEKE. *Allgem. Z. Bierbr. Malzfabr.*, 39, 449–500.—A mixt. of 1 part of cement, 2 of sand, and 2 of leucitophyr is more suitable than cement alone and cheaper than a mixt. of cement, trass, and sand, for cellars exposed to the saline or acid liquors of beer and yeast residues. Leucitophyr is a phonolite which comes into commerce as artificial potash manure at the price of 30 cents per 100 lbs. It contains 17.5% of alkalies as compared with 10.7% in trass. C. A. NOWAK.

Tests of Coal Tar Paint. F. P. BARRETT. *Eng. News*, 67, 196.—Tests of a coal tar paint in proportions of 8 : 1 : 1 to 16 : 4 : 3 of coal tar, kerosene and Portland cement showed that all tendency to run at high temps., to crack and attack steel by reason of the acids present was overcome by the use of cement. In testing lean tanks of 1 : 3 : 8 concrete were subjected to leakage, infiltration and pressure up to 74 lbs. per sq. in. in both painted and unpainted and the latter showed much superior results. A. J. PHILLIPS.

History of the Washington Bituminous Concrete Pavements. M. BROOKE. *Eng. Record*, 65, 132–3.—A summary of the behavior of the pavements from 1871 to-date, concluding that the mixing method is better than the penetration and the fewer courses in a pavement the better. A. J. PHILLIPS.

Novel Reinforced Concrete Pavement. ANON. *Mun. J. Eng.*, 31, 819–20.—A woven wire mesh for reinforcement, cypress boards 1 × 8 in. for expansion joints and a surface finish of $^1/_4$–$^3/_4$ in. granit chips are the features of a pavement laid at Plymouth, Wis. A. J. PHILLIPS.

Hardness of Plasters and Cements, and a Simple Chronographic Apparatus for Recording Set. C. F. MCKENNA. *Met. Chem. Eng.*, 10, 82–5; *J. Ind. Eng. Chem.*, 4, 110–4; *Cement Age*, 14, 88–92.—A discussion of the chem. of the setting of cement, and instruments for measuring the same with photos and descriptions of the Amsler-Laffon recorder, Nicol spissograph (*C. A.*, 5, 1983), and the Mckenna recorder. The latter consists of the record made by a no. of pins (0.015 in. diam.) inserted in a cement or plaster paste, which are pressed against and along a smoked glass rod by a movable finger on a revolving screw at definit time intervals. At the completion of set pins are snapped off by the lateral pressure and leave no record. From the records made by normal cements there is noticed about the 3rd hr. a relaxation of the first stiffness followed by a resumption of the hardening. This is also accompanied by a marked lowering of the temp. The explanation is

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advanced that the break indicates the sepn. from a sat. solution of a compd. and the softening of the colloid by the freed H_2O. Later by desiccation, crystn. and absorption of H_2O within the hardening proceeds. It is suggested that it may be necessary to distinguish between initial set reverse set and final set. A. J. PHILLIPS.

Creosoted Wood Block Pavement with Cement Grout Filler. A. J. SCHAFMAYER. *Eng. Record*, 65, 153–4.—The use of a cement grout filler increases amt. of expansion to be provided for in designing the pavement, requires greater care to prevent the grout from keeping open the expansion joints and reduces the annoyance caused by the accumulation of pitch and oil on the surface. A. J. PHILLIPS.

Proposed Specifications for Hollow Clay Tile Building Blocks. V. G. MARINI. *Eng. News*, 67, 248–9.—A study of crushing strength, fire tests, and tentative specification, covering quality, webs, bedding, loads, etc. LANGDON PEARSE.

Tests of Natural Building Stone. A. HANISCH. *Mitt. Technol. Gewerbemus. Wien*, 21, 28–51; through *Chem. Zentr.*, 1911, II, 103.—Tables are given of the numerous tests of limestone, granit, sandstone, basalt, gabbro, serpentine, etc. Notable are: location and structure, color, wt. (1 cu. dm. in a kg.), % by wt. of water absorbed after 8 days and compression in kg. per sq. cm. F. W. SMITHER.

Metallic Roofing. J. A. AUPPERLE. *Met. Chem. Eng.*, 10, 57–60.—Metallic roofing made of pure Fe is superior to all others. A partial review is given of the literature on influence of Mn and Cu on the corrosion of steel, and the presence of slag is shown not to be an indication of resistance to corrosion. Analyses are given of a chain from the Newburyport bridge, which has not been painted for 70 yrs., and of American ingot iron. The high purity of both and their resistance to corrosion is considered additional proof of the correctness of the electrolytic corrosion theory.
A. J. PHILLIPS.

Creosotes and Creosoting Oils. D. ALLERTON. *Eng. Record*, 65, 77–8.—The assumption that no matter how heavy an oil which contains no insol. matter may be it will penetrate, is fallacious. Coal tar has no preservative properties and mixts. containing creosote and various tars should be designated creosoting oils. Spec. for such oils should call for the % of creosote and the kind and % of material added (cf. *C. A.*, 5, 2937). A. J. PHILLIPS.

The Evaporation of Creosote and Crude Oils. P. E. FREDENDOLL. *Eng. Record*, 65, 79–80.—Lab. tests on creosotes before and after evapn. confirms the fact that those having the highest % of low-boiling oils suffer the greatest loss. Tests up to 1 yr. show that the addition of crude oil or residuum does not lower the rate of evapn. of the creosote. Evapn. varies according to the amt. of oil left in the wood as well as regards the size, shape and d. of the latter. The exact effect of the addition of a high-boiling crude oil has not yet been detd. A. J. PHILLIPS.

The Effect of Salt Impregnation on Timber. ANON. *Eng. Record*, 65, 134.—The life of salt-soaked timber is much extended when subjected to salt spray, but in a dry location the preservative is rapidly leached out. The complete filling of the cells by salt has a tendency to render the timber brittle. A. J. PHILLIPS.

An Investigation of Creosoted Wood Block Paving after Nine and One-half Years of Service. A. J. HAMMOND. *Eng. News*, 67, 42.—Blocks from a Chicago pavement were treated to find the characteristics of the creosote oil used and the amt. of oil remaining in the block. The loss in preservatives was 1½ lb. per cu. ft., the sp. gr. 1.06, that of the original being 1.08. The fractional distillation gave 46% up to 315° and the conclusion is that the use of coal tar, or creosote oil, with a sp. gr. over 1.08 is unnecessary (cf. *C. A.*, 5, 3508). A. J. PHILLIPS.

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The Construction of Wood Block Pavements. D. Okes. *Eng. Record*, 65, 76. A. J. Phillips.

The Youngstown Slag Road. Edit. *Municipal Eng.*, 42, 98–101.—The tar-slag section giving the best results employed a crude tar of the sp. gr. 1.187, distillate to 110°—1%, to 170°—6%, dead oils to 200°—9.2% to 270°—23.6%, free C 8.56%, contains high % of naphthalene. Directions are given for the distillation and fluxing of this tar to make an even more efficient binder. A. J. Phillips.

Road Materials and their Properties. L. C. Snyder. Oklahoma Geol. Survey, *Bull.* 8; *Mining. Sci.*, 65, 29–30. E. J. C.

Action of Air upon Lime (Levi, Orthmann). 29. Creosote Oil (Church). 22. Corrosion of Steel in Concrete (Mayfield). 9.

U. S., 1,017,211, Feb. 13. W. B. Hill. **Making cement.**

U. S., 1,017,636, Feb. 13. C. Ellis. **Preserving wood with oil containing dissolved arsenic.**

U. S., 1,017,912, Feb. 20. J. G. A. Rhodin. **Making slag cement.**

U. S., 1,017,913, Feb. 20. *Idem.* **Making a white hydraulic cement.**

Ger., 230,687, Nov. 13, 1908. J. Teufel. **Plaster having notches woven in the cloth.** Cf. *C. A.*, 6, 285.

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21. FUELS, GAS AND COKE.

J. D. Pennock.

Irish Peat as Fuel. W. Beswick. *Engineering*, 93, 127. E. J. C.

Suddite. Anon. *J. Roy. Soc. Arts*, 60, 197.—Suddite is made from the umsoof, grasses, papyrus and other plants that grow in and under the waters of the Nile river and its tributaries. The Sudd growth consists of plants 15–20 ft. high, and so rapid is the development that within 3 weeks of cutting it has grown again to a ht. of 7.5 ft. The raw material is chopped, dried and pressed into briquets, having a fuel value equal to one-half that of the present British coal shipped to the Nile. Arrangements are being made for the enrichment of suddite, which has, under experimental tests, given a steam test equal to 3 tons of the above coal. C. A. Cole.

Gas Combustion at Hot Surfaces. W. A. Bone. *Eng. News*, 67, 96–7; *J. Ind. Eng. Chem.*, 4, 77–9; *J. Frank. Inst.*, 173, 101–3; *Eng. Mining J.*, 93, 177–80; cf. *C. A.*, 5, 1984, 2714.—Hot surfaces have an accelerating effect on the combination of mixed gases. If an explosive mixt. of fuel gas and air is forced through an incandescent porous diaphragm, an extremely rapid combustion takes place at the contact surfaces and the heat developed keeps the material growing. By packing the tubes of a multitubular boiler with crushed fire brick and forcing the gas through as before, over 90% of the heat of combustion can be utilized in raising steam, if a feed-water heater is made a part of the boiler system. The capacity of such a boiler is about double that of the common type, as ordinarily run. C. A. Cole.

The Theory and Practice of High-pressure Gas. E. W. Smith. *Gas World*, 55, 705–7. George W. Morey.

Carbonizing, with Special Reference to High Makes. E. J. Steward. *Gas World*, 55, 675–8.—Paper and discussion. George W. Morey.

The Manufacture of Artificial Fabrics for Gas Mantles is no Monopoly. C. R.

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BOHN. *J. Gasbel.*, 54, 1207–14, 1232–6, 1254–61.—A study of patent rights and literature. GEORGE W. MOREY.

Gas Calorimetry. ANON. *Chem. Eng.*, 15, 12–4.—Abstract of report of the Calorimetry Comm. for 1911, Amer. Gas Inst., containing summary of the work done and discussing the comparisons of various new forms of calorimeters investigated and method of thermometer corrections. E. C. SCOTT.

Suction Gas Engins and Producers. W. A. TOOKEY. *Engineering*, 92, 475–8.—A comparison of test performances with results obtained in daily operation, and notes upon working costs for fuel, oil, labor, etc. C. A. COLE.

Testing Wash Oil for Naphthalene Removal. P. PANNERTZ. Crefeldt. *J. Gasbel.*, 54, 1004.—Illuminating gas is passed slowly (30–40 l. per hr.) through 2 towers filled with $C_{10}H_8$, then through flasks containing successively 20 cc. of the oil to be tested, citric acid soln., and picric acid soln. After passing 200 l. of gas the $C_{10}H_8$ in the picric acid soln. is detd. A good wash oil should not leave more than 2 g. $C_{10}H_8$ in 100 cu. m. GEORGE W. MOREY.

Tests of a Suction Gas Producer. C. M. GARLAND AND A. P. KRATZ. Univ. Ill., *Bull.* 9, 24.—The efficiency of the producer is, within wide limits, practically independent of the rate of gasification and is only slightly affected by the relative % of H and CO appearing in the gas. With low temp. in the fuel bed, due to the use of large quantity of steam, there is a high % H and CO_2. With high temp. in the fuel bed the H and CO_2 drop off, while the CO increases. Clinkering coals require large quantities of steam in order to keep the temp. below the formation of clinker, while non-clinkering coals require much less steam. The size of the fuel for a given temp. of fuel bed and a given depth of fuel bed has a marked affect upon the heating value and comp. of the gas, and upon the efficiency of the producer. An increase in the size of the fuel tends to cause the efficiency, heating value of the gas, and % CO to drop off. The vol. of gas generated per lb. of coal equaled 76 cu. ft. with a heating value of 110 B. t. u. per cu. ft. Under the conditions of the test, with anthracite coal at $5 per ton, one B. h. p. could be produced at fuel cost of 0.31 cents per hr., or 3.7 cts. per 12 hrs. C. A. COLE.

Uses of Blast Furnace Gas. RUDOLF BUCK. *Stahl u. Eisen*, 31, 1172–80, 1212–9, 1295–1301; *Iron Age*, 1911, 902.—B. favors a thorough cleaning, drying, and cooling of the gas and shows how same may be best effected. He favors a mixt. of blast-furnace and coke-oven gases, before coming to the reversing value, in about the proportion of 1 : 4, or which will give a B. t. u. content from 179 to 213. In a test with such mixt. the av. heating value was 199.3 B. t. u., furnace temps. from 1692 to 1900° and the results of this and other tests showed a good quality of steel. Analyses of gases and steel are given. C. A. COLE.

Proposed Standard Methods for Determining the Constituents of Foundry Coke. H. E. DILLER. Sec. Committee. *Am. Foundrymen's Association*, 1911, 559–62; through *J. Chem. Soc.*, 30, 1002.—Detailed methods regarding: Sampling from car, etc., prep. of sample, and detn. of moisture, volatil matter, ash and fixed C, S, and P. The paper is too detailed to admit of abstracting, and is issued as a series of recommendations on which discussion is invited. E. J. C.

Radiation in Explosions (DAVID). 2. Nitrogen Testing Apparatus (EVANS). 1. Heterochromatic Photometry (BELL). 4. Electricity *vs.* Gas (WIKANDER). 4. Determination of Free Carbon (FULWEILER). 22. Sulfur in Coal and Petroleum. 22.

U. S., 1,016,939, Feb. 13. F. O. GRIPP. **Making briquets of coal or coke.**

U. S., 1,017,025, Feb. 13. F. H. TREAT. **Gas producer.**

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U. S., 1,017,214, Feb. 13. E. S. HOYT. **Oil-gas generator.**

U. S., 1,017,495, Feb. 13. R. BELLAMY. **Gas generator.**

U. S., 1,017,677, Feb. 20. E. C. LARKIN and J. F. DUNCAN. **Composition for treating coal to facilitate its combustion.**

U. S., 1,018,152, Feb. 20. C. J. ATKINSON. **Vaporizer for gas producers.**

Ger., 230,318, Mar, 16. 1909. L. SOEST & Co. **Gas producer for bituminous fuel with an upper fire zone in which the fresh fuel is thermolyzed first in a crater-like enlargement by conduction and radiation from the fire below.**

22. PETROLEUM, ASPHALT, COAL TAR AND WOOD PRODUCTS.

R. E. HUMPHREYS.

Origin of Petroleum. PAUL W. PRUTZMAN. *Calif. Derrick*, 3, Nos. 1, 2, 3, 4, 5 and 6.—Development of the organic theory. R. E. HUMPHREYS.

Volcanic Origin of Petroleum Gases. ANON. *Calif. Derrick*, 3, No. 8, 11.—The steam present in lava eruptions acts on the silicates containing FeO. The latter is changed to Fe_2O_3 and H is liberated. The H unites with CO forming H_2O, CO_2 and CH_4. The most favorable temp. is 1000°. At 1300° CO unites with the superheated steam to form H, but at lower temps. CH_4 is always formed. The latter, in contact with chlorides and nitrates, may be transformed and condensed, thus producing the higher gaseous and liquid hydrocarbons. R. E. HUMPHREYS.

The Chemical Constitution of Mineral Oils of High Boiling Points. III. Paraffins, Naphthenes and Polynaphthenes. J. MARCUSSON. *Chimiste*, 2, 359–61; cf. *C. A.*, 5, 3728.—The formalite reaction is a test for unsatd. cyclic hydrocarbons only, while conc. HNO_3 can be used for unsatd. hydrocarbons in general. The test is made as follows: 10 cc. of the oil are dissolved in 10 cc. of benzine (b. p. 50°). This soln. is added drop by drop to 30 cc. of fuming HNO_3 (sp. gr. 1.52) cooled to —10°. 50 cc. of conc. HNO_3 are then added and the whole poured into H_2O. 3 layers are formed, the upper containing the unattacked oil in benzine, the lower, acids and products sol. in H_2O, and the middle, insol. products, showing the presence of olefins. The benzine soln. is washed free from acid and the solvent evapd. The residue, containing paraffins, naphthenes and polynaphthenes, is weighed. A table is given showing results of expts. with HNO_3, and H_2SO_4 and CH_2O on 3 Am. and 4 Russian oils. The portions not attacked by HNO_3 are uniformly smaller than the residues from formalite. The residues from HNO_3 have the smallest fluidity, those from the formalite reaction the greatest and the original oils occupy a mean position. The d. and n decrease regularly from the original oils through the residues from the formalite reaction to the residue from HNO_3. The oils recovered from formalite are strongly fluorescent; those from HNO_3 are not fluorescent. The middle layers were not examined as they were always small. The nitrated products in the H_2O were sepd. by chilling the soln. From the reactions and N contents of the ppt., the author concludes that dinitro compds. are formed. **IV. The Optically Active Constituents of Mineral Lubricating Oils.** See *C. A.*, 6, 545. F. M. ROGERS.

The Services of Moissan in the Chemistry of Petroleum. M. A. RAKUZIN. *Petroleum*, 7, 63–4.—The work of Moissan in connection with the carbide theory of the origin of petroleum is reviewed. The reactions of carbides of Li, Al, Fe, Mn, U, Ce, La, Sa, Ne, Pr, Zr, V, Ti, Mo, Cr, and W are given. O. E. BRANSKY.

Distillation Test for Water in Petroleum. PAUL W. PRUTZMAN. *Calif. Derrick*, 3, No. 5, 5.—The app. consists of a 1-pint Cu retort connected with a condenser. The

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distillate flows into a centrifuge bottle. A half-and-half mixture of C_6H_6 and $C_6H_5CH_3$ which has been distilled with H_2O is the reagent. 50 cc. of the petroleum are measured into the retort and the measuring vessel is rinsed into the retort with 50 cc. of the reagent. On distilling, the C_6H_6 and H_2O are driven over, and then the $C_6H_5CH_3$ comes over and sweeps the condensed H_2O clinging to the sides of the app. into the centrifuge bottle. After standing or whirling, the H_2O seps. into the graduated portion of the bottle and may be read. R. E. HUMPHREYS.

Physical and Chemical Properties of Petroleum Oils of the San Joaquin Valley, Cal. I. C. ALLEN AND W. A. JACOBS. Bureau of Mines, *Bull.* 19, 1–19; through *J. Soc. Chem. Ind.*, 31, 18.—The results obtained in the analysis of a large number of samples of petroleum oils from different oil fields in the San Joaquin valley are given in a series of tables. For the fractional distillation an electrically heated still was employed, the flask being encased in the 2 halves of a pear-shaped mold of heat-resistant material, on the inner or concave side of which was wound backwards and forwards a metal resistance wire for conducting the current. The material composing this heating device consisted of a mixt. of 100 parts of powdered magnesia, 100 parts of powdered SiO_2, 40 parts finely-shredded asbestos and 10 parts of powdered Na silicate, made into a paste with a satd. soln. of $MgCl_2$. The paste, after being molded on wooden blocks into the required form, was dried at about 50° for 48 hrs. and then for several hrs. at 200°. By the use of this method of distillation the temps. could be well controlled, and uniform results obtained. R. E. HUMPHREYS.

The Flow of Oil through Pipes. L. C. ERBICEANU. *Mon. d. pétrole roum.*; through *Chem. Tech. Ztg.*, 29, 106–8.—The fundamental equation is $V^2 = 1DJ/4b_1$, where V is rapidity of flow, D, the cross-section of the pipe, J, the hydraulic inclination and b_1, the function of all the established passive resistances, as cohesion, viscosity of the oil, and the roughness of the walls of the pipe. In the case of Fe pipes (cross-section 10–20 cm.) b_1 becomes the coeff. of friction, since the shape and character of the pipes are not considered. The coeff. of friction of benzine is 0.0002; of illuminating oil, 0.00025; crude oil, 0.0008; residuum, 0.0016. By substitution the equation shows that benzine flows faster than illuminating oil, which flows faster than crude oil. In practice, the friction values for the various oils can be detd. by measuring the force necessary to pump the oils through the same tube. The values for a tube 1 km. in length (L) and 200 mm. in diam. are obtained from the formula $64b_1LQ^2/\pi^2D^5$, where b is the coeff. of friction, D the cross-section of tube, and Q the vol. of liquid flowing per hr. Benzine has a friction value of 11.40; illuminating oil, 14.25; water, 16.25; petroleum distillates, 17.1; crude oil, 39.9; residuum at 25°, 91.20. O. E. BRANSKY.

Technical Investigations of Petroleum Residues. I. ROSENFELD-ROSIAN. *Chem. Tech. Ztg.*, 29, 177–9.—Hell and Medinges carried on, in 1874, the first investigation upon the sludge acids and alkali residues, and isolated an acid of the formula $C_{11}H_{20}O_2$. In 1890, Aschan sepd. from the residues of petroleum hexanaphthenic acid and 2 acids to which he gave the formulas $C_8H_{14}O_2$ and $C_9H_{16}O_2$. Organic bases corresponding to pyridine bases have also been isolated. The petroleum acids possess a decided antiseptic action, and their Cu and other salts, in soln. in benzine, are used for the preservation of wood. These acids are obtained in the following manner: The alkali residues are treated with the acid residues. The oil that seps. out is digested with superheated steam, and then washed with a dil. soln. of Na_2CO_3. After being heated with water for several hrs., it is treated with gaseous HCl, and the pure esters of the petroleum acids are obtained. To obtain colorless acids, they must be fractionated under reduced pressure (12 mm.). O. E. BRANSKY.

A Centrifugal Method for the Determination of Free Carbon. W. H. FULWEILER. *Good Roads*, 3, 72; *Eng. Contracting*, 37, 122.—About 0.1–2 g. of oil, water gas or refined

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coal tar are weighed into a centrifugal tube, dissolved in 50 cc. CS_2 and whirled till the free C ceases to contract. The tube is standardized with samples of known C content and figures showing a fair accuracy are given. A. J. PHILLIPS.

The New Regulations for the Petroleum Industry in Galicia. ANON. *Petroleum*, 6, 2225–32.—Provisions for avoiding and extinguishing oil well fires, for the safe construction of derricks, boiler houses, storage and gas tanks, and lighting systems are given in detail. Precautions for avoiding the inflow of water to the wells, and for removing the water are also described. O. E. BRANSKY.

Fuel Oil and the Marine. J. MENDEL. *Petroleum*, 6, 2293–2300.—The fuel equipment, especially for oil burning, of the navies of the United States, Germany, England, Russia, Austria-Hungary, Italy, and other nations is described. O. E. B.

Economy in the Use of Oil as Fuel for Harbor Vessels. C. A. MCALLISTER. *Engineering*, 93, 164. E. J. C.

Sulfur in Coal and Petroleum. ANON. *J. pétrole*, 1911, 5; through *Petroleum*, 7, 67.—The fear that boilers would be rapidly corroded in the use of S petroleums has proved unfounded. Since the introduction of oil as a fuel no unusual injuries to boiler pipes or plates have been reported. The harm done the boilers by the contraction caused by opening the furnace doors when feeding with coal, allowing cold air to rush in, is entirely avoided in using oil as fuel. O. E. BRANSKY.

Coke Oven Tars of the United States. P. HUBBARD. Off. Pub. Roads, *Circ.* 97.—The extraction and distillation of 26 tars showed that the % of free C is sufficiently low and the pitch residue soft enough to admit their use, as are water-gas tars, in the manuf. of road binders. A. J. PHILLIPS.

Specifications and Analysis of Creosote Oil. S. R. CHURCH. *Eng. Record*, 65, 80–1; cf. *C. A.*, 5, 2328.—The general tendency is toward the use of a high-boiling oil containing as little as possible distilling below 235°. Expt. has shown that the greatest antiseptic efficiency is possessed by oils b. 235–270°. By limiting the fraction below 235° to 25% the oil loses much of its antiseptic properties, while the consideration of the evapn. shows that the volatilization of the higher fractions carries off some of the higher b. compds. particularly naphthalene. A moderate high-boiling creosote is as stable as the highest fractions distilled therefrom. Lab. tests on 26 Am. tars showed that only 3 could meet the spec. in question and their rigid enforcement would eliminate over $^1/_3$ of the Am. and English oil. A discussion follows as to the proper position of the thermometer and its position above the surface of the oil is considered the rational one (cf. *C. A.*, 5, 2428, 2552, 2720). A. J. PHILLIPS.

Wood Pulp Alcohol. T. H. NORTON. U. S. Consular Report. *World's Paper Trade Rev.*, 56, 1236.—Fermentable sugars occur in waste sulfite liquor to the extent of about 0.5%. By neutralization of the liquor with $CaCO_3$ and fermentation a yield of 6 gals. EtOH per 1000 gals. liquor is obtained. The alc. contains denaturing substances. The process is in use in Sweden. Some attention is also being given to direct hydrolysis of ligno-cellulose and to wood distillation. V. NUNEZ.

Oils and Fats. 29. Detection of Excess of Colophony in Turpentine (DELFOUR). 26. Determination of Naphthalene (HAHN). 1. Creosotes and Creosoting Oils (ALLERTON). 20. Evaporation of Creosote (FREDENDOLL). 20. Coal Tar Paint (BARRETT). 20. Determination of Naphthalene (HAHN). 1.

U. S., 1,016,958, Feb. 13. A. E. ROBERTS and A. L. EMERY. **Transporting and heating oil in long pipe lines.**

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U. S., 1,017,587, Feb. 13. P. PORGES and R. NEUMANN. **Apparatus for cooling paraffin, etc.**

U. S., 1,018,040, Feb. 20. J. E. EGGLESTON. **Treating sulfur-containing petroleum.**

U. S., 1,018,374, Feb. 20. C. I. ROBINSON. **Treating sulfur-containing petroleum.**

23. CELLULOSE AND PAPER.

A. D. LITTLE.

Stability of Sulfite Celluloses. MATHEUS. *Papier Fabr.*, 9, 1375–7.—The principal considerations are: (1) the degree to which the pulp turns yellow; (2) becomes friable. (1) may be due to foreign substances which still adhere to the fibers, *e. g.*, rosin, and to severe bleaching, especially when mineral acids are employed. The friability may be occasioned by too severe bleaching or by the cooking. Convenient tests for the capability of turning yellow consist in treating the pulp with 5% NaOH soln. when it develops an orange color or by heating at 100° when it rapidly becomes dark brown.
V. NUNEZ.

Celluloid Industry in Japan. ANON. *Board of Trade J.*, Aug. 3, 1911; *J. Soc. Chem. Ind.*, 30, 1008–9. E. J. C.

Microscopy of some Paper Pulps. T. F. HANAUSEK. *Papier Fabr.*, 9, 1305–8; cf. *C. A.*, 6, 422.—Microscopic study (with illustrations) of butea-cellulose, made from the dhak tree native to the Indian tropics. V. NUNEZ.

Magnesium Sulfate as a Substitute for Alum in Writing Paper. P. KLEMM. *Wochbl. Papierfabr.*, 42, 4954–6; cf. *C. A.*, 5, 3155.—Through theoretical considerations K. concludes that as much alum is required for sizing when used with $MgSO_4$ as without, and therefore no economy is derived from the use of Epsom salts.
V. NUNEZ.

Uses and Selection of Talc in Paper Making. ANON. *Paper*, [4] 6, 13–4.
V. NUNEZ.

Recovery of Black Liquor in Sulfate and Soda Pulp Mills. ANON. *Pulp Paper Mag. Can.*, 10, 16–20.—Description of new Kellner system of evapn. V. NUNEZ.

Mold Growths on Wood Pulp. F. BARNES. *Pulp Paper Mag. Can.*, 10, 27–9.—Description and illustration of principal fungi which attack wood pulp in storage.
V. NUNEZ.

Absorbent Cellulose (BARONI). 17.

U. S., 1,017,023, Feb. 13. F. L. STEWART. **Making cellulose suitable for nitration from the fiber of maize.**

U. S., 1,017,320, Feb. 13. E. L. RINMAN. **Precipitating sodium bicarbonate from waste liquors from soda-pulp mills.**

U. S., 1,017,931, Feb. 20. C. H. WAITE and G. WALKER. **Making paper with a mottled or variegated surface.**

Ger., 231,561, Apr. 18, 1909. FR. C. WICKEL. **In the coloring of tissue paper and the like, the coloring comp. is applied by means of rolls in the form of a paste contg. hardly any H_2O, the required viscosity being obtained by suitable additions. Details are specified.**

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24. EXPLOSIVES.

C. E. MUNROE.

Keeping Properties of Blasting Gelatin. S. SODDY. Mexico. *Arms and Explosives*, **20**, 22–3.—A note on the reduction in strength of blasting gelatin during storage for 1 yr. Lead block tests on original samples varied from 570 to 600 cc. with No. 6 detonators; on samples after 1 yr. storage, 340–420 cc. With No. 7 detonators normal results were obtained. S. concludes that the uncompleted process of gelatinization goes on during storage, the nitroglycerin becoming more thoroughly absorbed, thus rendering the explosive less sensitive. S. recommends a stronger cap for old cartridges of gelatin and suggests a trinitrotoluene cap. C. G. STORM.

Moisture Relations of Nitrocellulose Powders. N. L. HANSEN. Denmark. *Z. ges. Schiess-Sprengstoffw.*, **6**, 461–4.—An experimental study of the relation between hygroscopic moisture and thickness of powder grains. The tubular or strip powder was cut in suitable lengths and the loss of wt. in drying 3 hrs. at 80° considered moisture. Samples of varying thickness were thus dried and then exposed to the air for 1 yr., during which period daily weighings were made. For a thickness of 0.8 mm. or greater, the moisture values (av. for 1 yr.), follow a curve whose equation is $y = (2/x)$, while for thinner grains the av. moisture content is practically constant at 2.10%. This is explained by the assumption that the moisture is not confined to the surface but penetrates to a depth of about 0.4 mm. C. G. STORM.

Investigations of Fuse and Miners' Squibs. C. HALL AND S. P. HOWELL. Bur. of Mines, *Tech. Paper*, **7**.—The authors describe these devices in detail; give rate of burning; quantity of powder per ft. of fuse; size of grains; gaseous products of combustion; efficiency of "spit;" action in inflammable gas mixts.; precautions to be taken in use; and government specification for purchase. CHARLES E. MUNROE.

Investigations of Explosives Used in Mines. C. HALL, W. O. SNELLING, S. P. HOWELL, G. A. BURELL AND CHARLES E. MUNROE. Bur. of Mines, *Bull.* **15**.—The authors treat of nature and comp. of explosives; thermochemistry of explosives; characteristics of natural gas used at the Pittsburgh Testing Station; app. and methods for physical tests of explosives; results of tests with permissible explosives, dynamite, black blasting powder and 4 foreign explosives; and a review of conditions leading up to the establishment of the Pittsburgh Testing Station. CHARLES E. MUNROE.

Regulations for the Transportation of Explosives and other Dangerous Articles by Freight and by Express. *Interstate Commerce Commission*, 1911. C. E. M.

The Rate of Burning of Fuse as Influenced by Temperature and Pressure. W. O. SNELLING AND W. C. COPE. Bur. of Mines, *Tech. Paper*, **6**.—The authors describe in detail the nature, comp. and construction of fuse giving trade terms used to designate the different varieties; comp. of fuse powder; normal rate of burning; influence of pressure, temp., moisture and mechanical injury to fuse on rate of burning; and the conclusions drawn from the investigation as to application of the results in practice. CHARLES E. MUNROE.

A New Application of Detonating Fuse to Public Works. M. L. BARTELEMY. *Z. ges. Schiess-Sprengstoffw.*, **6**, 425–7, 445–7.—A description of the destruction of the Hollebeck tunnel in Belgium, Nov. 3, 1910. 2125 holes were drilled and charged with a total of 3250 kg. of "Melanite" (78 nitroglycerin, 4 nitrocellulose, 18 $NaNO_3$). These were fired simultaneously by means of the Lheure detonating fuse, containing trinitrotoluene (velocity of detonation approx. 6000 m. p. s.). The fuses from all the sep. holes were all connected with a central fuse running the length of the tunnel. A total of 7000 m. of detonating fuse were used. The work was entirely successful.

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The use of this detonating fuse has resulted in a saving of 20% in powder used, owing to the more complete detonation resulting. C. G. STORM.

The Decomposition of Trinitrotoluene under the Influence of Heat. M. VEROLA. *Mem. poud. saltpetres.*, 16, 40–51.—In expts. to det. the vapor tension of trinitrotoluene at high temps. by means of a special app., fully described, it was noted that there was a gradual decomp. of the substance at temps. much below its point of deflagration in air. In another form of app., the vols. of gaseous products liberated from 5 g. trinitrotoluene at 160°, 180°, 201°, and 217.5° were measured during definit intervals of time. At 160° decomp. resulted very slowly. The vols. of gas liberated per g. varied from 8 mm.^{3} per min. at 180° to 200 mm.^{3} per min. at 217.5°. By heating a small quantity of the explosive in a test tube immersed in an oil bath whose temp. was raised gradually, it was found that very rapid decomp. resulted at 281–6°. The fact, however, that a similar decomp. resulted after 5 hrs. heating at a const. temp. of 200°, appears to indicate that the heat of decomp. of the trinitrotoluene raises the temp. of the heated substance far above the bath temp., and that therefore the actual temp. of decomp. was much above that observed. The addition of inert material (sand), to a sample caused an absorption of this heat of decomp. and prevented the rapid decomp. even with 9 hrs. heating at 200°. It was noted that previous heating of trinitrotoluene caused a lowering of its m. p. From an original m. p. of 80.75°, heating 5 hrs. at 180° reduced the m. p. to 78°; 2½ hrs. at 201° gave a m. p. of 77°; ½ hr. at 217.5°, m. p. of 59°. Continuous heating at 130° for 100 hrs. had no effect on the m. p., while 80 hrs. on the same sample at 150° reduced the m. p. to 80.25° and 177 hrs. at 150° gave a further reduction to 79.9°. It is evident that the explosive is very stable at 130°, decomp. beginning at about 150° and increasing rapidly as the temp. rizes. From these results trinitrotoluene shows a marked similarity to nitrocellulose in its behavior, although only affected by much higher temps. than the latter. Saposhnikov found that nitrocellulose (12.0% N) evolved about 14 mm.^{3} in 10 hrs. at 120°; this corresponds with the rate of decomp. of trinitrotoluene at about 180°. Trinitrotoluene is evidently a perfectly stable explosive at ordinary temps. C. G. S.

Brisant Explosives. M. NEUMANN. *Z. angew. Chem.*, 24, 2233–40.—Brisant explosives are those which can be exploded only by means of a detonator, and not by flame alone. The chief classes of brisant explosives are aromatic nitro compds., nitric esters, and NH_4NO_3 explosives. The chlorate and perchlorate explosives also form a sep. class. The various tests for strength of explosives (Trauzl block test, mortar test, compression test, etc.) and for velocity of detonation (spark chronograph, and Dautriche method) are described and their value discussed. These tests illustrate the great difference between brisant explosives and those of the black powder type, *e. g.*, the former have a rate of detonation of 1800–8000 m. p. s., the latter a rate of explosion of about 300 m. p. s. The rate of detonation of some explosives varies greatly with the degree of confinement, while others, such as picric acid, detonate almost as rapidly free as confined. The resistance offered by the mass of the explosive also affects the rate of detonation; thus liquid nitroglycerin has a rate of about 2000 m. p. s. and trinitrotoluene (compressed), about 7000 m. p. s., showing that there is no relation between sensitiveness and rate of detonation. Brisant military explosives belong chiefly to the class of organic nitro-substitution products. Of these, picric acid and trinitrotoluene are the most efficient. The properties of these two explosives are compared in detail. N. calls attention to his recent discovery of the fact that in blasting with picric acid, etc., on hard surfaces (Fe beams, rails, etc.), a 3–5-fold greater efficiency results if the explosive is not entirely in close contact with the surface, a hollow space being left in the explosive charge on the side adjacent to the surface to be acted upon. [Abstractor's note: The same fact was noted by C. E. Munroe in 1888. "Expts.

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with High Explosives," *Ex. Doc.* No. 20, U. S. Senate, 53rd Congress, 1893.] Illustrations are given of the methods used for modifying an explosive so as to render it suitable for any particular class of work, *e. g.*, nitroglycerin gives a Trauzl test of 540 cc. and rate of detonation about 2000 m. p. s.; by the addition of 8% nitrocellulose a velocity of 7000 m. p. s. with approx. the same Trauzl test (530 cc.) is obtained. By the addition of proper ingredients explosives may be thus obtained with proper characteristics for use in hard or soft rock, clay, coal, etc. Similarly, explosives with short flame and low temp. of explosion, suitable for use in gassy or dusty coal mines are obtained. A description of methods of testing explosives for safety under such conditions is given.
C. G. STORM.

A Comparison of French and Foreign Sporting Powders. Report of "Commission Centrale du Service des Poudres." *Mem. poud. saltpetres.*, 16, 21–6.—Detailed results of an investigation on the relative merits of the French nitrocellulose powder "T" as compared with the Italian "ballistite" and the Belgium "mullerite," selected as the best representatives of reputable foreign powders. Charges of 1.8 g. ballistite, 2.3 g. mullerite and 2.5 g. poudre T gave approx. equal velocities, while the pressures were resp. 400, 550, and 600 kg. Other comparisons are made and conclusion reached is that the French powder is not inferior to the best foreign powders. C. G. STORM.

French Smokeless Powders. ANON. *Arms and Explosives*, 20, 20.—A criticism of the French Commission's report (cf. preceding abstr.). The foreign powders used for comparison with the French powder are not considered representative powders for such comparison; instead, so-called "bulk" powders should have been used (occupying same bulk as equiv. black powder charge). Ballistite and mullerite are condensed powders. The pressure obtained with the French powder is considered entirely too low for satisfactory results. The French methods in general are strongly criticized.
C. G. STORM.

The Manufacture of Priming Compositions. OSCAR HAGEN. *Z. ges. Schiess-Sprengstoffw.*, 6, 201, 224, 243, 265, 283, 308.—An extensive and excellent treatise on blasting cap comps. H. discusses the theory and action of various mixts. and considers in great detail processes of manuf., chiefly that used at the Alder factory. (1) Materials: Hg fulminate, Sb_2S_3, powd. glass, KCO_3, gelatin, etc.; their preps., purification and cost. (2) Mixing: dry, wet, and Alder's method. The latter method is preferred. The damp ingredients are mixed, treated with C_2H_5OH to ppt. the dissolved material, filtered through cloth and pressed out by hand. Various comps. used for both military and blasting purposes are given in tables, including comps. free from Hg fulminate, *e. g.*, $KClO_3$ and $Hg(CNS)_2$. The prep. of the latter is described. (3) Granulation: rubbing the pressed-out comp. by hand through sieves, coarse and fine. (4) Drying: about 15–20 min. at 45–50° required. (5) Sifting: all coarser than 50 mesh and finer than 100 mesh is rejected and regranulated with fresh material. About 60% is of proper granulation. The article is illustrated with many cuts of app., and notes all precautions to be observed in such dangerous work, costs of materials, labor, and finished product. Methods of analysis: The factory method for comps. containing $KClO_3$ and Hg fulminate usually consists in extracting 1 g. with H_2O, drying and weighing the insol. residue as Hg fulm., taking the $KClO_3$ by diff. As the solubility of the former will cause an error of about 4% where only 50 cc. H_2O are used, the dissolved Hg should be pptd. as HgS, dried, weighed and calc. as Hg fulm., the calc. wt. added to the wt. of insol. residue. The $KClO_3$ may be checked by reduction with $FeSO_4$. When Sb_2S_3 and powd. glass are present, treat with HNO_3 (1.2 sp. gr., followed by fuming HNO_3), then with HCl, warming gently; filter off powd. glass. Ppt. HgS with NH_4HS, wash with H_2O, EtOH (abs.), and CS_2, dry at 100°. Wt. × 1.22 = Hg fulm. Ppt. Sb_2S_3 + S from soln. with HCl, wash with H_2O, EtOH, and CS_2 and dry;

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oxidize with HNO_3, dry and weigh as Sb_2O_4. The $KClO_3$ in filtrate and washings is converted to K_2SO_4 by evap. with H_2SO_4 and weighed, or may be detd. in orig. sample by extracting with H_2O, pptg. HgS, evapg. filtrate with HCl and weighing as KCl. C. G. STORM.

The Catastrophe on the French Battleship Liberté. ANON. *Z. ges. Schiess-Sprengstoffw.*, 6, 438–9; cf. *C. A.*, 5, 3910.—Some of the powder in the Liberté's magazines had been manufd. as early as 1899, and objections had been made to its storage on the ship. The flooding of the forward magazines was impossible as the valves could not be reached because of the heat, smoke and fumes. The time between the first and the last explosions was sufficient to raise the temp. sufficiently to cause explosion of the mellinite shells in the ammunition room. C. G. STORM.

Radiation in Explosives (DAVID). 2.

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25. DYES AND TEXTIL CHEMISTRY.

L. A. OLNEY.

Review of the Recent Brands of Dyes from the Point of View of their Application to Dyeing. F. REVERDIN. *Mon. sci.*, [5] 2, I, 83–92; cf. *C. A.*, 5, 3912. E. J. C.

Review of the Chemical Technology of Textils for 1909. A. CHAPLET. *Rev. gén. chim.*, 15, 21–31. E. J. C.

The Sizing of Cotton Goods in Relation to Subsequent Processes. F. WHOWELL. *Textil Inst. J.*, 2, 43–53; through *J. Soc. Chem. Ind.*, 30, 1007.—Certain of the ingredients employed for sizing warp yarns exert very injurious effects upon the cloth in some of the subsequent processes, *e. g.*, singeing, bleaching, dyeing and printing. A moist atm. and a certain amt. of moisture in the yarn are practically essential to ensure good results in the weaving. To prevent mildew in sized warps the sizer incorporates a small amt. of $ZnCl_2$, $MgCl_2$ or $CaCl_2$ with the size, which acts at the same time as an antiseptic and as a deliquescent. All these chlorides tend to dissociate at high. temps., and cloths containing them are liable to become tendered after passing through the singeing process. The heat of the singeing machine liberates HCl which destroys the fibers of the cloth. The irregularly distributed damaged parts betray themselves in the form of holes with clean cut edges, distinct from the frayed edges of mechanically damaged parts. Another objectionable substance often used in sizing is paraffin wax, the object being to lubricate the sized threads for the weaving process. Tallow is the proper substance to employ for this purpose, but paraffin is used either because it is cheaper or in the form of adulterated tallow. Paraffin wax and similar unsaponifiable substances are not emulsified in the b. processes to which the goods are subjected preparatory to bleaching or dyeing. The wax is simply loosened, floats to the top of the kier and settles on the goods in the form of patches producing gray water-resistant stains which cannot be bleached or dyed. Sometimes the wax remains evenly distributed over the cloth without forming patches, in which case the fibers remain absolutely resistant to the calendering operation and the cloth finished up quite limp. Mineral oil stains derived from the lubricating oil of the loom or other machinery are likewise objectionable, and it has been clearly demonstrated that mineral oil stains resist all known processes of bleaching, but it would appear that a mixt. of vegetable and mineral oils is not so harmful. In the discussion, P. BEAN pointed out that the use

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of deliquescent chlorides is not confined to the object of facilitating the weaving operations. $MgCl_2$ and $CaCl_2$ are used illegitimately to increase the wt.; these chlorides attract excess of moisture, enabling the cloth to carry more "filling." "Yorkshire grease" has been mentioned as a substitute for tallow, but this is not always safe.

E. J. C.

Some Constituents of Raw Cotton. E. KNECHT. *Textile Inst. J.*, 2, 22–9; through *J. Soc. Chem. Ind.*, 30, 1007.—Raw Egyptian cotton-sliver was exhaustively extracted with benzene, yielding 0.47% of crude cotton wax having the appearance and consistence of bees-wax (cf. *C. A.*, 5, 3911). On treatment with petroleum spirit the crude wax was resolved into 2 constituents: (1) Sol. cotton wax A (70%), m. 66–7°, pale color, for the most part a true wax, containing besides, some free fatty acids, small proportions of glycerides and some hydrocarbons; and (2) insol. cotton wax B m. 68°, dark green granular but plastic substance and containing very little free fatty acid. The Egyptian cotton deprived of wax yielded on extraction with alc. 0.68% of a solid ext., amorphous, very hydroscopic and of a very rich brown color. Aq. extraction, which followed, gave 1.46% of brown hydroscopic substance similar to the alc. ext. NH_4OH ("25 cc. of strong NH_3 per l.") extracted 0.48%. Formic acid at similar diln. extracted 0.46% of matter which was mainly mineral. Texas cotton yielded 0.55% of crude wax sol. in benzene; the alc. ext. amounted to 0.90% and contained 1.07% of N; it reduced Fehling's soln. strongly; the aq. ext. was 1.61%, ammoniacal ext. 0.39%, formic acid ext. 0.72%. The exhausted Texas cotton was digested with cold dil. HCl and yielded a further 0.43% of ext. Bengal cotton yielded only 0.38% of crude wax. Spinning trials were conducted on the large scale with Egyptian cotton deprived of its wax. The dewaxed material behaved very badly in the drawing and spinning processes giving an excessive amt. of waste, irregular results and showing a tendency to adhere to the rollers. Finer counts gave great trouble and breakages were extremely frequent. In the loom, used as warp, the dewaxed thread was also troublesome on account of breaks. The yarn spun from the dewaxed cotton was 24.5–27% weaker than the ordinary yarn. Extraction of the wax from ordinary yarn after spinning increased the strength by 13%; the addition of 2% of paraffin wax to this extracted yarn decreased its strength again by 33%. J. Hubner has conducted dyeing expts. with the cloth manufd. from the dewaxed raw Egyptian cotton. Substantive dyes gave lighter shades on the extracted cotton than on the ordinary. Methylene blue and certain other dyes dyed darker shades on the extracted cotton.

E. J. C.

The Textil Fiber Industry of Brazil. ANON. *J. Roy. Soc. Arts*, 59, 920–1.—There are indigenous to Brazil, and growing wild in certain regions, two species of cotton-bearing trees of interest to the com. world because of their possibilities as producers of cotton fibers.

E. J. C.

Manufacture and Application of Hypochlorite Solutions (KERSHAW). 18.

U. S., 1,011,500, Dec. 12. K. SCHNITZSPAHN. **Making phenylglycine salts.**

U. S., 1,011,770, Dec. 12. H. GELDERMANN. **Azo dye** derived from diazotized 6-nitro-4-chloro-2-aminophenol and 2-naphthol-4-sulfonic acid.

U. S., 1,012,055, Dec. 19. M. T. BOGERT. **Azo dyes** made by coupling a diazotized aromatic compd. with compds. containing the quinazoline nucleus.

U. S., 1,012,363, Dec. 19. L. KALB. **Making halogenated indigo dyes.**

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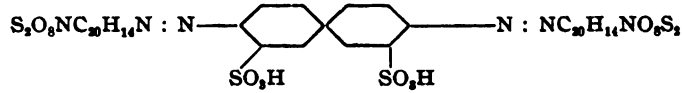
U. S., 1,012,619, Dec. 26. O. ERNST and H. EICHWEDE. **Dyeing cotton fast to washing and capable of being discharged.**

U. S., 1,012,853, Dec. 26. G. HOLSTE. **Dyes,** alkali salts of aminobenzoyl compds. of diaminodiphenylureadisulfonic acid, which can be diazotized on the fiber and combined with azo dye components.

U. S., 1,012,960, Dec. 26. A. ZART. **Disazo dye** probably having the formula



U. S., 1,016,928, Feb. 13. H. B. BISHOP. **Removing iron stains from fabrics by hydrofluoric acid.**

U. S., 1,017,151, Feb. 13. J. A. JAMIESON. **Raising the nap of cloth by treatment with a bicarbonate and an acid.**

U. S., 1,017,176, Feb. 13. R. SCHRECKENBACH. **Treating raw and worked fibers such as hemp, flax or jute with glycerol, sodium peroxide solution, etc., to soften them.**

U. S., 1,017,547, Feb. 13. F. JAUMANDREU. **Apparatus for treating textils with liquids.**

Brit., 12,009, May 18, 1911. FARBWERKE VORM M. L. & B. Mfg. **monoazo dyes** particularly suitable for preparing violet color lakes by combining 1-diazonaphthalene-2-sulfonic acid with 2-naphthol-3-carboxylic acid.

Ger., 229,705, Apr. 6, 1905. P. CHEVALIER. **Mfg. adhesive cloth** from threads without weaving, in a hollow, heating drum serving for the winding of the thread running through a reservoir contg. gum soln., the soln. being laid on by an elastic brush and evenly distributed by an elastically borne pressing roll.

Ger., 230,299, Aug. 20, 1909. G. MALARD. Addition to 218,522. **Obtaining potash from raw wool.** Construction of app. specified.

Ger., 230,442, Mar. 13, 1910. P. A. J. DE LANGE and R. PUSCH. App. for **gaging and regulating the depth of nuance of color solutions in dyeing.**

Ger., 230,669, Apr. 9, 1909. A. HABEL. **Mercerizing** chain thread yarns or woven goods with the employment of rotating stretching rolls for passing the material through the single treatment vats.

Ger., 231,392, Apr. 22, 1910. KALLE & Co. **Development of fast printing green.** Details are specified.

Ger., 231,940, Jan. 15, 1910, and 231,941, Apr. 12, 1910. Additions to 230,142. E. G. STARK. In the **treatment of brittle plant fibers,** such as the seed fibers of kapok, calotropis, akon, and the so-called plant silks, to prepare them for spinning, dyes are added to the solvents. Bleaching substances can also be added. Cf. *C. A.*, 6, 161.

26. PIGMENTS, RESINS, VARNISHES AND INDIA RUBBER.

A. H. SABIN, DAVID SPENCE.

Tests for Adulteration of Oils Used in Painting. A. GAUTIER. *Chimiste*, 2, 197–8. E. S.

Detection of Excess of Colophony, or of Added Rosin Oil, in Oil of Turpentine. H. DELFOUR. *Bull. des. travaux. soc. pharm. Bordeaux*, 1911, 373; *Bull. de commerce*,

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39, 561–2; through *J. Soc. Chem. Ind.*, 31, 33.—Two drops of a 1 : 100 alc. soln. of fuchsin are dild. to 10 cc. with dist. H_2O; 1 cc. of oil of turpentine is added and well shaken up; then 2 drops of NH_4OH soln. are added. In presence of excess of colophony a red ppt. will be thrown down; if the oil be of good quality, the liquid will remain clear. On adding a further 20–30 drops of NH_4OH soln. and allowing the mixt. to stand, the upper layer will be colorless if the turpentine be free from excess of rosin. Rosin oil gives similar results to colophony. The test will indicate the presence of 3% of either of these. The limit of rosin which may be tolerated is 2.5%. The test is therefore not too stringent. Good com. turpentine oil will yield only 1% in solids on evapn. The above reaction was originally employed by Mennechet to detect "white spirit" in turpentine oil. It is not due to that adulterant, however, but solely to the presence of resin acids in the oil. R. E. HUMPHREYS.

Determination of Rosin Acids in Fatty Oils. *Fats and Oils, Vienna, No.* 20 (1911); through *Seifenfabrikant*, 32, 8.—The following method is said to be useful to det. the amt. of rosin in linseed oil varnishes: Into a 250 cc. separatory funnel, 50 cc. petroleum ether and 20 cc. 96% alc. are introduced and 5 g. of the oil. Phenolph. is added and the soln. titrated with *N* NaOH to redness. Sufficient H_2O is added to make a 60% alc. soln. and the soap soln. withdrawn and after the addition of 1 cc. NaOH the alc. is evapd. on a H_2O bath, transferred to separatory funnel and ether and HCl added and shaken. The ether soln. is drawn off and evapd. and the residue dissolved in 20 cc. abs. alc., put into a separatory funnel, 20 cc. petroleum ether and 1 cc. conc. HCl added and the soln. shaken. More alc. is added if an emulsion forms, and the soln. allowed to esterify over night, after which it is titrated as above and H_2O added to make a 60% alc. soln. The rosin soap soln. is withdrawn and after evapn. of the alc. the rosin acids are sepd. dried and weighed. E. SCHERUBEL.

A Recent Dammar Resin from Central Borneo (Dammar Daging). E. GOTTLIEB. *Arch. Pharm.*, 249, 701–5; through *J. Soc. Chem. Ind.*, 31, 34.—A specimen of recent dammar resin was obtained in central Borneo from the plant *Vatica rassak* Bl. It is known to the natives as "dammar daging." It is yellowish white with reddish streaks here and there. It contains no N. The lower and upper m. p. are 130° and 150°. The direct acid value is 140–142, the indirect 148.4–151.2. The cold sapon. value after 1–3 days is between 159.6 and 162.4; the hot sapon. value after 1–2 hrs., 163.5 and 165.2. The resin was extracted successively with alk. solns. By extn. with Na_2CO_3 soln. about 35% of a resin acid, $C_{24}H_{44}O_4$ was sepd., while subsequent extraction with KOH soln. gave about 30% of another acid, $C_{13}H_{26}O_3$. Upon distilling the residue with steam, 15% of essential oil passed over, leaving 16% of a resene, $C_{22}H_{28}O$. R. E. HUMPHREYS.

A Recent Fossil Dammar Resin from Central Borneo. E. GOTTLIEB. *Arch. Pharm.*, 249, 705–10; through *J. Soc. Chem. Ind.*, 31, 34.—The dammar resin was found buried in the earth. It is darker in color than the resin of the preceding abstract, and contains no N. The lower m. p. is 130° the upper 150°. The resin was first extracted with ether, then with a mixt. of ether and alc. The ether-ext. was treated successively with alk. solns. The portion sol. in ether yielded an *acid*, $C_{10}H_{26}O_2$, on extn. with $(NH_4)_2CO_3$ soln.; and *acid* $C_{14}H_{22}O_2$ with Na_2CO_3 soln.; and *acid*, $C_{12}H_{18}O_2$ with KOH soln. In addition, a resene and an essential oil were found. The portion sol. in ether-alc. contained an acid and a resene, $C_{12}H_{22}O_2$. A portion of the residue left after the above extractions were sol. in alc., the remainder not being sol. in any organic solvent. The resin has the properties of a copal. R. E. H.

Factice. EUGEN SEIDL. *Gummi Ztg.*, 26, 244.—White factice (substitute) is made from rape-seed oil, castor oil, linseed oil, or cottonseed oil. Oils are mixed

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with 20–45% sulfur monochloride at ordinary temp. until the mass solidifies. The reaction raises the temp. to about 80°. The solid mass is ground on the mill to allow HCl gas to escape, washed with dil. lime water, then with water. Drying is effected at a temp. not exceeding 50°. Previous to adding S_2Cl_2, oil may be mixed with 50% by wt. of benzine, whereby the temp. is kept low and product is obtained which is lighter in color, more spongy and more elastic. Coloring matter is dissolved in benzine and added in soln. To prevent further formation of HCl 2–3% of MgO or of quick lime are added. Brown factice is made of same oils as white factice. Oil is heated to 180° with 17–22% S. Oxidized oils require only 6–8% S. To obtain floating factice mineral oil or paraffin is added. Brown factice resists oxidation successfully for considerable time. It can be subjected to higher temp. than white factice without injury and is extensively used in hot vulcanization. A special factice is obtained by mixing with the oil $^1/_2$ of the S required for ordinary factice, then heating to sirupy consistency and after cooling, mixing with the necessary S_2Cl_2. The operation can also be inverted, *i. e.*, S_2Cl_2 can be added first, then S. D. SPENCE.

Experiments in Tapping Hevea brasiliensis. R. H. LOCK. *Circ. and Agr. J. Roy. Bot. Gardens, Ceylon.*, 5, 231–306.—The yield per tapping increased with the interval between successive tappings up to an interval of 4 days and remains high up to an interval of 9 days. There is a seasonal variation in yield and % of rubber in latex, with the max. about Dec. and min. about May. There is no close relation between rainfall and yield for particular months. H. B. SLUSSER.

Report on the Chemical and Physical Properties of Samples of Hevea Rubber from Heneratgoda Gardens. R. H. LOCK AND KELWAY BAMBER. *Circ. and Agr. J. Roy. Bot. Gardens, Ceylon.*, 5, 209–16.—Samples of Ceylon rubber from various tappings were shipped to England, then vulcanized and tested. The strongest rubber with the lowest resin content is obtained after frequent tappings. For a short period of tapping the trees tapped more frequently have a lower % of organic material than trees tapped less frequently, but after continued tapping this relation is reversed. Tapping stimulates the trees both to the production of raw materials and to the conversion of these into rubber. With frequent tappings raw materials are produced faster than they can be converted; with less frequent tapping the reverse is true. The frequency of tapping has a very slight effect on the India rubber content (by diff.) and ash. H. B. S.

Variability of Plantation Rubber. F. KAYE. *India Rubber J.*, 41, 153.—Variations arize from inequalities in latex, or variations from precise conditions of coagulation. Latex varies in its rubber and resin content according to age, location and time of year. Conditions of coagulation vary similarly. K. suggests need of careful scientific study along these lines. W. W. EVANS.

Coal Tar Paint (BARRETT). 20. Condensite. 4.

U. S., 1,017,141, Feb. 13. C. ELLIS. **Paint and varnish vehicle.**

U. S., 1,017,323, Feb. 13. J. A. ROUTHIER. **Paint vehicle and furniture polish.**

U. S., 1,017,926, Feb. 20. E. TAYLOR. **Vulcanizing oils and resins.**

U. S., 1,018,385, Feb. 20. L. H. BAEKELAND. **Varnish containing a condensation product of phenols and formaldehyde.**

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27. FATS, FATTY OILS AND SOAPS.

E. SCHERUBEL.

Fatty Acids. S. FACHINI AND G. DORTA. *Seifenfabrikant.*, 32, 3, 105–6; cf. *C. A.*, 5, 797.—A qual. and a quant. sepn. of liquid from solid fatty acids has been worked out, based upon the solubility of the acids in pure acetone at 0°. Fatty acids of high mol. wt. are insol. while those of low mol. wt. are sol. The sepn. of liquid from solid fatty acids by means of their K salts can be accomplished as follows: The fatty acids are dissolved in 90% acetone with warming, 10% of a soln. of *N* KOH added and the soln. cooled to 15° and the crystals filtered off. The fatty acids in the filtrate and those from the crystals are isolated and the I no. detd. The K salts of high mol. wt. fatty acids are insol. in cold acetone, those of low mol. wt. are sol. To sep. stearic and palmitic acid from myristic and other liquid fatty acids dissolve 1 g. of the mixed acids in 90 cc. of acetone, b. p. 56–7° and add an excess of *N* KOH at room temp. Water is added to make vol. up to 100 cc. and the soln. heated and then cooled to 10° and filtered. The fatty acids from filtrate and ppt. are then sepd. The method is not exact, for when there is much myristic and little palmitic acid present some of the former ppts. with the latter but when the reverse conditions prevail the method is exact. By repeating the process pure acids can be obtained. A table is given showing results on mixts. of stearic, palmitic and myristic acid. E. SCHERUBEL.

Olein and its Examination. P. VASTERLING. *Apoth. Ztg.*, 26, 949–51. W. O. E.

Seal Oil. A. W. HOPPENSTEDT. *J. Am. Leather Chem. Assoc.*, 7, 13–4.—Seal oil is obtained by steaming the blubbers of various species of seal. The high grade oil is light yellow and a second grade is brown. Consts. for the "brown" oil: D. at 15.5°, 0.9230; free fatty acids as oleic, 11.56%; acid no., 22.09; sapon. no., 192.7; I no., 141.3; unsaponifiable, 0.09%; test with conc. H_2SO_4, brown; test for Menhaden oil, reddish yellow; cold test 5.5° F.; odor, brown cod oil. The above are almost the same as for brown cod-liver oil, which is extensively used in leather manuf., for which seal oil is suggested as a substitute. CHARLES R. OBERFELL.

Oil Palms in the Lake Tanganyika District. E. ZIMMERMANN. *Tropenflanzer*, 15, 549–59; *J. Soc. Chem. Ind.*, 30, 1265.—The chief forests of palm trees near Lake Tanganyika are in German territory. A single tree produces 75 kg. of fruit, from which the natives extract 7 half liters of pure oil for sale and 2 half liters of less pure oil for their own use. By means of European plant 10–12 l., or in many cases 15 l., of oil would be obtained. 14–18 kg. of kernels are also annually produced by each tree. The varieties of palm producing the best oil are known locally as kibuyi and ihote, the fruit of the latter yielding 50–80% more oil than that of the former. There is also a third variety, itunguru, which yields a more fluid oil than the others. It is used locally as a lamp oil. J. J. M.

Oils and Fats. 29. Rosin Acids in Fatty Oils. 26. Methods of the German Pharm. (STUEWE). 17. Containers for Edible Fats and Oils (EMERY). 12.

U. S., 1,016,864, Feb. 6. M. WILBUSCHEWITSCH. **Apparatus for producing catalysts for treating fats, etc.**

U. S., 1,017,692, Feb. 20. H. G. SCHANCHE and F. S. HAVENS. **Making resin soap.**

U. S., 1,017,693, Feb. 20. H. G. SCHANCHE. **Making resin soap.**

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28. SUGAR, STARCH AND GUMS.

A. HUGH BRYAN.

The Technical Value of Commercial Dextrins for Use as Glue and Sizing Material, and their Manufacture. F. PREUSS. *Z. Spiritusind.*, 34, 291.—An exam. of high grade dextrins for technical purposes revealed the following: They were prepared from potato flour which was not always of highest quality, and were completely sol. in water. They contained: Dextrose 2–4%, ash = 0.15–0.30%, free acidity figured as HNO_3, 0.15–0.20%. From the analytical results P. outlines a method of manuf. which will yield a product similar in nature to those analyzed. C. A. NOWAK.

The Inversion of Sugar by Bees. H. KORNDOERFER. *Apoth. Ztg.*, 26, 659.—A 50% soln. of sucrose, fed to bees and deposited in the comb, was centrifuged and after ½ hr. examined for invert sugar. Two analyses revealed 42 and 44%, resp. On standing several days the centrifuged product was found to be inverted to the extent of 99%. It exhibited an acid reaction and yielded 0.023 and 0.024% formic acid.
W. O. EMERY.

Clerget Inversion. E. SAILLARD. *Rev. gen. chim.*, 15, 1–3.—S. calls attention to the fact that the German factor (142.66) for calc. cannot be used when using the French instruments and the French method. The proper factor then is 144.
P. B. DUNBAR.

The Use of the Refractometer in the Sugar House. W. E. CROSS. *Louisiana Planter*, 48, 73.—The refractometer gives readings for moisture close to the official method (drying for 10 hrs. at b. water temp.) in cane products. It should be valuable for detg. the d. of products that are being boiled for "string proof." On account of its ease and quickness of detn. it should become as valuable in time as the polariscope has become. A. H. BRYAN.

Estimation of Lime in Sugar Factory Products. J. WEISBERG. *Bull. assoc. chim. sucr. dist.*, 28, 933–8.—The objections of Sidersky (*C. A.*, 4, 1816, 3149) against the use of soap soln. are weak. His views that not only the organic but the inorganic compds. of lime are indicated is practically impossible for Ca salts in the cold are not quantitatively broken up by this titration. A. H. BRYAN.

Perfecting the Methods for Extraction of Sugar Juices. MANOURY. *Bull. assoc. chim. sucr. dist.*, 28, 890–3.—Two new means for the betterment of diffusion work are brought forth. In one the battery is divided into 2 parts and in the other the battery serves as a filter press, the cossets being held by sieves. A. H. BRYAN.

Notes on the Chemical Control of Sugar Manufacture. F. SACHS. *Bull. assoc. chim. sucr. dist.*, 28, 904–19.—Sugar in beet is detd. by the cold water digestion method of Sachs-Le-Docte. The true estn. of dry substance in massecuites and juices should be done by direct drying but in the ordinary course of control, too many errors can be introduced by this method and the ordinary areometric or pycnometric method gives satisfactory results. The av. results of 25 Belgian and Holland sugar factories for the past 19 yrs. are given. The sugar content of the diffusion juice serves as the starting point of the chem. control. A. H. BRYAN.

The So-called Gallisin in Technical Starch Sugar. J. GATTERBAUER. München. *Z. Nahr. Genussm.*, 22, 265–90.—Gallisin or glucosin is a dextrin-like substance isomeric with maltose but more difficultly fermentable. On hydrolysis it yields only dextrose and is probably formed by the reverse process from the action of acids upon dextrose in the manuf. of starch sugar. Gallisin is obtained from a completely fermented soln. of starch sugar as a thick sirup. By treatment with abs. alc. and ether

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a hygroscopic yellowish powder is obtained. This substance is fermentable very slowly by beer yeast. The ash-free, dry substance has a reducing power of 66.70% (as maltose) and a sp. rotation of about 100°. Yeast maltase, emulsin, mineral and oxalic acids invert to dextrose. Higher conc. of mineral acids causes a reversion to gallisin. The phenylosazone of gallisin, red-brown crystals; m. 97–100°; decomp. 112°. Its alc. soln. is dextro-rotatory. Gallisin *p*-nitrophenylosazone, red amorphous powder; m. 240°; decomp. 244–5°. The addition of NaOH soln. gives a blue color. Amorphous esters of gallisin were formed with more or less difficulty with BzCl, *p*-chlorobenzoyl chloride, *m*-nitrobenzoylchloride, and benzenesulfone chloride.

E. L. P. TREUTHARDT.

Danger of Fire in Sugar Refineries. F. J. T. STEWART. *Am. Sugar Ind.*, 13, 276; through *J. Soc. Chem. Ind.*, 30, 971.—The risk attending the pulverization of sugar, and the need for conducting this in a sep. building, or sep. compartment, is clearly shown. The outer wall of the building should be made of some light material. No dust room should be used. Dust should be kept down by spraying in an enclosed chamber of incombustible material. All pulverizing mills should be equipped with magnets and some form of explosion preventer. J. J. M.

Optically Active Substances of the Beet Destroyed by Lime on Heating. F. HERLES. *Z. Zuckerind. Böhmen.*, 36, 72–9.—The fact that beet juices treated with lime show a lower polarization has been confirmed by a number of investigators, but many of these do not believe that this lowering is due to decomp. of optically active substances by the lime. Weisberg attributes it to pptn. of Pb saccharate by the action of CaO and normal Pb acetate. H. does not believe this possible, as there is always an excess of normal Pb acetate and, hence, little basic acetate could be formed. Pellet did not find optically active substances and likewise H. did not, when working on French and Belgium beets. The last campaign showed many samples of beets having optically active substances present which were destroyed by the lime treatment. The amt. depends upon nature of soil, methods of cultivation, fertilizer, seed employed, etc., and was as high as 0.57% on the beet at times. A. H. BRYAN.

Simplified Method for the Determination of the Optically Active Substances, Decomposable by Lime on Heating, that are Present in the Beet. F. HERLES. *Z. Zuckerind. Böhmen.*, 36, 79.—The milk of lime used is made by slacking 100 g. of CaO with water, b., and making up to 1 l. Normal Pb acetate is made by dissolving 350 g. to 1 l. in water. For the detn. 2 polarizations are necessary. (1) Double normal wt. of the juice is taken in 100 cc. flask, 40 cc. of the 35% Pb acetate soln. and 10 cc. of the well-mixed lime water are added, the froth removed by ether, the vol. completed with water, and the contents shaken until all the lime has dissolved; filter and polarize. (2) Double normal wt. of the juice is taken and 10 cc. of lime are mixed and the whole boiled for 3 mins. over naked flame, or kept 10 mins. in b. water bath, cooled, 40 cc. of the Pb acetate added, and vol. of 100 cc. completed with water, shaken, filtered and polarized. The decrease in polarization is due to the decomp. of the optically active substances. A. H. BRYAN.

Starch Color, Beet Sugar Color and Beer Color. A. DANIEL. *Chem. Ztg.*, 35, 1373–4.—D. has attempted to distinguish between the various classes of caramel by treatment with hot 90% alc., filtering and detg. the rotation and reducing power before and after inversion. While the reducing sugars differed somewhat in caramel derived from starch and that derived from sugar, a distinction sufficient for accurate differentiation did not occur. E. M. CHACE.

Velocity of Sugar Hydrolysis (ROSANOFF, *et al*). 2. Molasses Food (FALLADA).

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12. Fertilizing Sugar Beets (BRIEM). 15. Sugar Determination (FILLINGER). 11B. Optical Behavior of Dextrose (PROFILO). 10.

Ger., 231,960, Jan. 1, 1900. A. HOLSTE WROE. **Bleaching starch.** Perborate, mixed with starch, is allowed to act on the goods. This treatment is also an advantage in ironing. Perborate 8% and starch 92% are recommended. Na persulfate may be employed instead of the perborate.

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29. LEATHER AND GLUE.

LLOYD BALDERSTON.

Qualitative Analysis of Tannins. U. J. THUAU AND P. DE KORSAK. *Cuir*, 4, 383–9; *Collegium*, 1911, 258–60, 262–5.—The authors verified the results of Stiasny and Jean, that the catechol tannins are pptd. by b. with formaldehyde and HCl, while pyrogallol tans give little or no ppt. An untreated chestnut ext. gave no ppt., but samples decolorized with blood or $PbCO_3$ gave ppt., which is attributed to the substances used in clarification. A method of detecting mangrove in quebracho ext. is suggested, based on the white ppt. which the former gives with $AgNO_3$ (see following absts.).

L. BALDERSTON.

Analysis of the Tannins. L. POLLAK. *Collegium*, 1911, 313–4.—Referring to the article by Thuau and de Korsak (see preceding abstr.) P. states that the test for mangrove by means of $AgNO_3$ has long been known to him. The ppt. is AgCl, the presence of Cl in the mangrove being due to the fact that mangrove grows in salt water marshes. L. remarks that if Cl is present in the water used in making an ext., it will all pass on into the ext., and that the use of HCl in the sulfiting process also introduces Cl into the ext. The test must be used with discretion, and is of little value alone.

L. BALDERSTON.

Thuau and de Korsak's Method for Detecting Mangrove in Tanning Extracts. L. ALLEN AND M. AUERBACH. *Collegium*, 1911, 333–4.—The authors confirm the results of Thuau and de Korsak, and use the ash of the ext. in making the test. While a quebracho ext. made with dist. water gave no ppt., pure exts. made with natural waters give varying amts. of ppt.

L. BALDERSTON.

Estimation of Free Sulfuric Acid in White Hide and Leather. B. KOHNSTEIN. *Collegium*, 1911, 314–7.—The sources of free H_2SO_4 in hides and leather are mentioned; also the damage which it causes. Extraction of the free acid from the pulverized leather is difficult and at best incomplete, and the resulting soln. is so highly colored that titration with any known indicator is well-nigh impossible. K. neutralizes the free H_2SO_4 by means of Mg acid carbonate, made by dissolving $MgCO_3$ in water charged with CO_2. This does not transpose the $CaSO_4$, and unites with the free acid without rise in temp. To 200 cc. of the soln. in a separatory funnel add 30 g. of the finely divided leather. Pass a current of CO_2 through the liquid and shake. Draw off the liquid and repeat 3 or 4 times. Boil to expel CO_2, thus pptg. most of the $MgCO_3$, which carries down much of the tannin, etc. Add 3 g. of feshly ignited MgO and filter. Evap. an aliquot part of the filtrate and ignite the residue. Mg compds., except the sulfate, are thus rendered insol. Moisten the ash with water containing CO_2 and again gently ignite. The residue, consisting almost wholly of $MgCO_3$ and $MgSO_4$ is taken up in distilled water and filtered. $MgSO_4$ in the filtrate is detd., and H_2SO_4 calc.

L. BALDERSTON.

Qualitative Reactions of Vegetable Tannins. E. STIASNY AND C. D. WILKINSON.

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Collegium, 1911, 318–32; *Chem. Eng.*, 15, 65–71.—(Preliminary rept. of a Comm. of the I. A. L. T. C.). Color tests are apt to be useless in the case of mixts. and should be replaced as far as possible by tests which enable us to sep. the different tannins. S. and W. used solns. of 3 concs., about 0.4 g., 4 g., and 28 g. per l. 34 solns. were tested with NaCl, NH_4Cl, $(NH_4)_2S$, Br, $CuSO_4$ and NH_4OH, Pb acetate, tartar emetic, and the ammonium acetate test. The first 3 were not found promising. The filtrate from Pb acetate ppt. in no case gives coloration with Fe alum. Excess of NaOH gives a yellow color to the filtrate of quebracho, sumac and pistachia, but none with the other common tans. In all cases the filtrate from basic Pb acetate gives no color with excess of NaOH. Wood pulp ext. is incompletely pptd., and NaOH colors the filtrate. The Pb ppt. of quebracho, mangrove, mimosa and gambier is sol. in $CH_3.COOH$, that of the pyrogallol tans slightly sol. or insol. A table shows color reactions of the AcOH filtrates with Fe alum, and Fe alum + NaOAc. Pistachia is shown to contain a mixt. of different tans. Test for wood pulp in chestnut ext.: To 5 cc. of soln. (4 g. per l.) add 5 cc. 10% Pb acetate soln. To a portion of the clear filtrate add NaOH in excess. Yellow coloration indicates wood pulp. Confirm by Procter and Hirst's aniline test. Tartar emetic test: (1) Add 10 cc. 4% tartar emetic soln. to 5 cc. tan soln. (4 g. per l.). Wood pulp, quebracho, and mangrove give no ppt., oak wood, complete pptn., gambier, turbid, other tans, incomplete pptn. (2) To 5 cc. tan soln., (4 g. per l.) add 10 cc. of a soln. containing 4% NaCl and 4% tartar emetic. Wood pulp gives no ppt., oak wood, complete pptn., all others partial pptn. To 10 cc. NH_4OAc (40%) add 5 cc. tan soln. (28 g. per l.). All catechol tans, no ppt. Salts of Al, even in minute amts., cause copious ppt. Chestnut and oak, immediate copious ppt.; valonia, myrobalans, gradual pptn.; sumac, ppt. after 12 hrs.; wood pulp alone, no ppt.; wood pulp + any tannin, copious ppt. The $CuSO_4 - NH_4OH$ test is best tried in dil. soln., 0.4 g. tannin per l., to 2 or 3 cc. of which 3–5 drops of a 1% soln. $CuSO_4$ and 3 cc. of a soln. containing 5% NH_3 are added. Quebracho, mangrove, gambier, pistachia, myrobalans, no ppt.; chestnut, oak, sumac, immediate ppt.; mimosa, ppt. over night; wood pulp, no ppt. Formaldehyde test: To 50 cc. of soln. containing 4 g. per l., add 5 cc. strong HCl and 10 cc. 40% HCHO. Boil with reflux condenser $^1/_2$ hr., cool and filter. Note any ppt. while b. Test filtrate with Fe alum + NaOAc, and with excess of NaOH. A table of results is given. Catechol tans are completely pptd., pyrogallol tans giving a slight ppt. or none. The Br test uses Br water, 4–5 g. per l., 5–10 drops of which are added to 2–3 cc. tan soln., 4 g. per l. Catechol tans are pptd., pyrogallol tans not. Wood pulp hinders or prevents pptn. and when added to the ppt. dissolves it. Solubility tests were carried out with acetic ether. In a small separatory funnel, 25 cc. tannin soln. (4 g. per l.) were repeatedly shaken out with acetic ether, and 20 cc. of the water soln. evapd. to dryness. The residue is expressed as a % of the res. from 20 cc. of the original soln. This process was also applied to solns. from which an alc. ppt. had been filtered. Several tables of results are given. S. and W. tried to find I numbers for various tannins, but abandoned the effort as unpromising. L. B.

The Composition of Leather from Different Parts of the Hide and the Importance of a Proper Sample for Analysis. C. R. Oberfell. *J. Am. Leather Chem. Assoc.*, 7, 27–31.—Samples from the butt, shoulder and belly of oak-tanned sole leather were analyzed in order to show the variation likely in comp. The per cents are resp.: moisture, 13.16, 12.50, 13.15; oil, 3.26, 4.77, 4.63; uncombined tannin, 17.59, 19.27, 17.23; uncombined non-tannin, 3.43, 3.86, 3.60; combined tannin, 18.21, 18.83, 19.23; hide, 44.24, 40.67, 42.05; ash (insoluble), 0.11, 0.10, 0.11; tannage no., 41.2, 46.3, 45.7. Charles R. Oberfell.

Report of Leather Analysis. (1911 Committee.) F. P. Veitch. *J. Am. Leather Chem. Assoc.*, 6, 565–79.—Problems studied: (1) The time required for extracting

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fats; (2) a comparison of several methods of extracting water-sol. matter; (3) a comparison of basic and normal Pb acetate as clearing agents in the sugar detn. Directions for the work, results and comments fully given. Recommendations; (1) Fats completely extracted in 6–10 hrs.; (2) no change in the method for water-sol. matter, although the method of the Bur. of Chem. gave more concordant results than the official method; (3) normal Pb acetate superior to the basic salt in that more sugar was obtained when using it. C. R. O.

Report of the Committee on Acidity of Tan Liquors (1911). L. BALDERSTON. *J. Am. Leather Chem. Assoc.*, 6, 579–86.—Thymol, naphthalene and mustard oil were used as antiseptics to prevent the loss of acid. Naphthalene to the amt. of 0.1% was effective in preserving the acid for 2 weeks. Thymol in 0.05% proportion was found more satisfactory than naphthalene, while results with mustard oil by one collaborator were satisfactory. The influence of varying amts. of gelatin used in pptg. tannin was studied and it was found that as long as the tannin was pptd. an excess of gelatin had practically no effect. C. R. O.

The Value of the Non-tans in Tanning Materials and Extracts. J. G. PARKER AND J. R. BLOCKEY. *J. Soc. Chem. Ind.*, 30, 1433–7.—The introduction of closed autoclaves for the extraction of materials in the manuf. of exts. has resulted in a greater yield of sol. substances, and this causes the non-tans to be much higher than in ext. obtained by open extraction. In detg. to what extent the non-tans in an ext. actually penetrate the fibers and give wt. to leather, pieces of pelt were tanned in liquors made from various exts. containing varying percentages of non-tans by the addition of non-tanning matter sepd. from the original ext. The liquors thus obtained contained the same % of tannin, but varying percentages of non-tans. Pieces of pelt 2 × 4 inches from a butt were delimed, and then tanned in the various strengths of liquor by suspension, or "still" tannage and also by rotating in a churn, or "drum" tannage. Samples were taken during the tannage for analysis and the finished leathers were analyzed. With chestnut ext. in the drum tannage the most thorough tannage took place where no excess of non-tans was present, and the added non-tans retarded the penetration of the tannins. Similar results only more marked, were found in the still tannage. Oak-wood ext. in a similar series of expts. gave results of the same character as chestnut ext. One influence of the non-tans is in the production of acidity. Some of the liquors used in these expts. were allowed to stand and the amt. of acid developed was measured from time to time. In every case the amt. of acid was greatest in the liquors with the most non-tans. CHARLES R. OBERFELL.

Sulfite-cellulose Extracts. W. EITNER. *Gerber*, 37, 227–9, 241–3, 255–6.—In König's process, the "lye" from paper-pulp is decolorized with Zn dust, and the lime pptd. out. This product is used as a "filler." It contains no real tans, but the $ZnSO_4$ retained has a slight tanning effect. The Zn serves to detect this ext. when used as an adulterant. Another brand recently put on the market claims 26% tans and 28% non-tans, and that the latter are by oxidation during the tanning process converted into tanning substances. E. does not credit this. His analysis indicates that this ext. is very like the König product, and contains no acid-forming sugars as claimed. Hide treated with pinewood ext. made a stiff, horny product which on boiling went entirely to glue. As a filling material for leather already tanned, these exts. are very efficient because of their penetrating power. In E.'s expts. leather absorbed 8.5–15%. L. BALDERSTON.

Report of the Committee on Oils and Fats (1911). *J. Am. Leather Chem. Assoc.*, 6, 586–93.—Investigation of methods for analysis of mineral oils used on leather were made, including the following tests: gr., evapn., viscosity, reaction, purity, emulsification, flash point. No definit conclusions or recommendations. C. R. OBERFELL.

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The Development of the Leather Industry in its Relation to the World's Hide Supply. A. H. LOCKWOOD. *J. Am. Leather Chem. Assoc.*, 7, 35–41. C. R. O.

The Production of Leather and Fur which will Resist Treatment with Boiling Water. J. SCHNEIDER AND V. SIMACEK. *Collegium*, 1911, 368–9.—The water-resisting powers of various leathers was tested by treating them with hot water and testing the resulting soln. with tannin and NaCl. Also, pieces of hide were treated with b. solns. of various metallic salts and organic compds. The action of the b. water was least on the pieces treated with compds. of Cs, V, Cr, U, and Pt, and with HCHO, acetone, hydrochinone, and phloroglucinol. L. BALDERSTON.

Colors and their Application to Leather. H. C. MERRILL. *J. Am. Leather Chem. Assoc.*, 7, 15–27. CHARLES R. OBERFELL.

The Use of Chrome Leather in the Valuation of Tanning Extracts. G. GRASSER. *Collegium*, 1911, 390–2.—Chrome-tanned calf-skin is substituted for the substances used for detg. the color of the leather produced by a tanning ext. Dissolve 25 g. liquid or 8 g. solid ext. in 100 cc. water at 70°, and cool. In this shake a piece of chrome tanned calf leather 8 × 10 cm. in size for 1 hr. Let the piece of retanned leather lie in the dark for 3 hrs. and then wash well. Wipe with a clean cloth and dry in the dark. The shade of the resulting combination tanned piece is not influenced by the original green color of the chrome leather except in the case of very light colored extracts in very dilute solution. In making the comparisons, the quantities of ext. used should be such as to give equal amts. of tannin. L. BALDERSTON.

The Action of Air upon Lime. LOUIS E. LEVI AND AUGUST C. ORTHMANN. *J. Am. Leather Chem. Assoc.*, 6, 593–97.—Lump lime which is commonly used in the tannery is open to objection (1) on account of the grit it contains, (2) it is often imperfectly burned and (3) it rapidly slakes in the air. The grit is liable to scratch the grain of the skins. The air slaking causes a loss by reducing the amt. of available CaO. Hydrated lime is free from these objections. To obtain data on the action of air on hydrated, lump and powdered lump lime, 30 g. samples were weighed in open glass dishes about 4 in. diam. and $^1/_2$ in. deep, then exposed for 48–336 hrs. A sample dish was taken every 48 hrs. and analyzed. The hydrated lime loses less CaO by exposure to moist air up to the 240-hr. period inclusive. The apparent loss of $CaCO_3$ in the lump and powdered lump is due to the absorption of water before the CO_2 of the air begins to convert the oxide to carbonate. CHARLES R. OBERFELL.

Stripped Myrobalans. ANON. *Oil, Paint and Drug Rep.*, 1911, Oct. 6; *J. Soc. Chem. Ind.*, 30, 1271.—The hull of myrobalans contains nearly all the tan. It has therefore been proposed in Calcutta to ship only the hulls. L. BALDERSTON.

Liming Hides for Sole Leather. J. TERRELL. *Leather*, 3, 570–1; *J. Soc. Chem. Ind.*, 30, 1023.—The 3-pit system of liming is described. J. J. M.

Vat Tannage. M. NIHOUL. *Cuir*, 4, 307–15; *Chimiste*, 2, 213–5, 307–15.—A lecture reviewing the chem., physical and bacteriological processes involved in the tannage of heavy leather. L. BALDERSTON.

Examination of Tannins (CAVAZZA). 7. Determination of Trypsin in Dog Dung (EBERLE, KRALL). 11B. Examination of Waters, Etc. (MORRISON). 14. Seal Oil (HOPPENSTEDT). 27.

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30. PATENTS.

Abstracts of patents are included under the foregoing divisions of the Journal. The abstracts of U. S. patents are prepared by Earl T. Ragan, those of the British,

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French and German patents by O. D. Swett and those of Canadian patents by Russell S. Smart, of Fetherstonhaugh & Co., Ottawa (5 Elgin St.). The abstracts of French patents are prepared, with permission, from the abstracts in *Chemiker-Zeitung*, those of German patents from *Chemiker-Zeitung* and *Chemisches Zentralblatt*.

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CHEMICAL ABSTRACTS

Vol. 6. APRIL 20, 1912. No. 8

I. APPARATUS.

L. C. JONES.

Simplified Apparatus for Examination of Flue-gas. ANON. *Chem. Ztg.*, **35**, 1388.—An Orsat app. with but 1 absorption pipet. J. H. MOORE.

Cheap Substitute for Kipp's Apparatus. B. OPPLER. Göttingen. *Chem. Ztg.*, **36**, 96. J. H. MOORE.

Substitute for Separatory Funnel. KILIANI. *Z. anal. Chem.*, **51**, 102.—A bottle with 2-hole cork, in one hole a siphon tube which may be pushed down to the bottom of the layer to be removed, and in the other a tube for blowing in the bottle to start the siphon. J. H. MOORE.

An Automatic Siphon. K. KLING. *Chem. Ztg.*, **36**, 32.—It consists of 2 glass tubes, one slipping closely into the other, and each supplied with a check valve at the bottom. The top of the inner tube is drawn to a small diam. and bent over, for attaching the hose. To set in operation, the inner tube is raised and lowered once or twice, thus filling it and the hose, after which the flow continues. J. H. MOORE.

New Calcium Chloride Tube. P. HARTMANN. *Chem. Ztg.*, **36**, 23.—A small metal cylinder closed at the bottom and with entrance and exit tubes on opposit sides at the top. Another cylinder, open at the bottom, slips in and extends nearly to the bottom of the outer cylinder, leaving an annular space between, except at the top, where the joint is tight. An extension of the entrance tube delivers the gas in the top of the inner cylinder whence it passes down through the $CaCl_2$ and up the annular space to the exit. J. H. MOORE.

A New Normal Drop Counter. H. KUNZ-KRAUSE. *Chem. Ztg.*, **36**, 15–6; *Pharm. Zentralhalle*, **52**, 1312–3.—Salleron type. J. H. MOORE.

A Simple Apparatus for Determination of Small Quantities of Arsenic. V. N. IVANOV. *Chem. Ztg.*, **36**, 31–2.—A small U-shaped tube with one arm longer than the other is fastened in a small funnel by means of a piece of rubber tubing on the long arm. A stopper on the funnel stem fits a small flask or a test tube for generating the AsH_3. A 10% $Pb(OAc)_2$ soln. is poured in the funnel until the short arm of the U-tube is about $^1/_3$ immersed. A thin pad of glass wool is laid over the funnel and a filter paper over the wool, the edges turned down over the funnel and held by a rubber band. The center of the paper is moistened with a drop of an alc. soln. of $HgCl_2$ which is turned yellow or brown by the AsH_3. For quant. work this color is compared with standards prepared with known amts. of As. J. H. MOORE.

A Modified Gooch Filter. W. R. FORBES. *Chem. News*, **105**, 27.—F. suggests a pneumatic washer, adjustable to various crucibles, in place of the customary rubber connection. H. V. MAIN.

Two Thermoregulators. W. R. BOUSFIELD. *Chem. News*, **105**, 13–4.—(1) A barometric form for 240 v. heater, using a H bulb connected at the contact of Hg and Pt as expanding element. (2) A modified Lowry gas regulator in grid form. H. V. MAIN.

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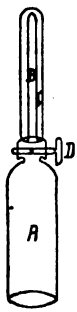
Coal Combustion Recorders. A. H. GILL. *Chem. Eng.*, 14, 376–7.—Historical sketch of CO_2 recorders. H. V. MAIN.

A Simple Apparatus for Determination of Carbon Dioxide. E. RUPP. *Chem. Ztg.*, 36, 59–60. J. H. MOORE.

Universal Flask. F. GABRIEL. *Chem. Ztg.*, 36, 44.—A round bottom distn. flask with a short side neck which fits with a ground joint into an air-cooled tube which is bent almost at a right angle a few cm. beyond the joint. A Liebig cooler may be attached to the air-cooled tube, the ground joint allowing it to be used as a return cooler or for fractionation without emptying the flask. J. H. MOORE.

Fractional Distillation Apparatus. J. ROBERT. *Bull. soc. encour. ind. nat.*, June 1911; through *Met. Chem. Eng.*, 10, 60–1; illus.—Steam or gas heated still for fractional or simple distillation under any pressure. Self-sealing joints used to condenser. Fractionating capacity, depending on size, of 4–22 kg. per hr. H. V. MAIN.

Buret for Gas Analysis. JUAN PESET Y ALEIXANDRE. Valencia. *Anales fac. cien., Zaragoza*, 2, 179–82.—This is designed for the exact sepn. of gas and absorption liquid. *A* and *B* are full of Hg; *D* is closed and the gas and liquid passed into *A*. By immersion under Hg the tube *C* full of Hg is placed on *A* as indicated. The cock *D* is carefully opened and the gas passed into *C* by depressing *A* sufficiently in the Hg (*B* is about 3 mm. in diam. and has a $^1/_2$ mm. opening at the tip). As the liquid just reaches the tip of *B* the cock *D* is closed, thus effecting the sepn. desired. H. S. PAINE.



Simple Laboratory Suction-pressure Pump. F. LIEBERT. *Chem. Weekblad*, 8, 382–3.—A pump for forcing gas through app. in which the back pressure cannot be overcome by the aid of an ordinary gas-holder is described. The gas does not come into contact with lubricants. E. J. C.

A Projection Apparatus for Chemistry Lectures. A. STOCK. Breslau. *Z. Elektrochem.*, 17, 995–1002.—S. illustrates the use of a projectoscope in a form adapted for lecture room work, so arranged, that neither the lantern nor screen interfere with the table demonstrations. Illustrations are given. W. E. RUDER.

Measuring Devices for Pressure and Velocity of Gases and Vapors. ERNST STACH. Bochum. *Stahl u. Eisen*, 31, 1752–58, 1880–6.—Full illustrations and descriptions of various types. E. J. WITZEMANN.

Apparatus for Filtration at Low Temperatures. H. J. PRINS. Delft. *Chem. Weekblad*, 8, 874–5.—On the oustide of a tube (*A*) pierced with a number of small holes is fitted a thimble of filter paper; *A* is also fitted with a rubber stopper, through which passes a narrow glass tube reaching to the bottom of *A* and connecting through a receiver (a filter flask) to a suction pump. *A* is immersed in the mixt. to be sepd., which is contained in a wider vessel surrounded by a suitable freezing mixt. By this simple arrangement satisfactory sepns. of liquid and solid phase may be made at any desired temp. J. JOHNSTON.

Cutting of Tubes by Etching. J. MILBAUER. *Chem. Ztg.*, 35, 669.—The tube to be cut is horizontally fixed on supports. A moist cord is wound in a single loop around the place where the cut is desired. The upper end of the cord dips in a mixt. of 3 parts HF and 1 part conc. HCl held in a paraffined bowl above the tube. The soln. is drawn along the cord by gr. and gradually etches its way through the tube. Quartz glass is similarly cut. J. S. GOLDBAUM.

Vacuum Pans with Jackets. B. VIOLA. *Metal. Chem. Eng.*, 10, 102–3.—Working drawings and heating formulas of various types (*C. A.*, 6, 1918). H. V. MAIN.

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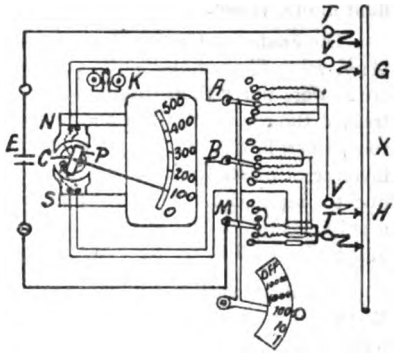
An Instrument for the Measurement of Small Resistances. F. Bock. *Elektrotech. Z.*, 33, 43–4; cf. *C. A.*, 6, 3.—A meter which gives direct readings of resistances; 5 sep. ranges permit the measurement of R between 10 microhms and 5 ohms. The movable part consists of 2 coils, placed in the same plane at an angle to each other, and carries a current proportional to the current flowing through the conductor whose R is to be tested and to the potential drop in this conductor. This system swings free in the field of a permanent magnet, and the position assumed by the pointer depends on the resultant of the forces produced by the currents in the 2 spools, and is therefore detd. by the strength of the current which is proportional to R.

R. W. Moore.

Diagram of Connections



N, S = Magnet Poles
E = Battery
C = Current Coil
P = Potential Coil
K = Cut-out
A B M = 3-pole graduated resistance
X = Resistance to be measured
H, G = Potential Contacts

Radium Perpetuum Mobil (Greinacher). 3. Wort-cooling Apparatus (Heinzelmann). 16. Testing Varnish-makers' Benzine (Kantorowicz, Keisermann). 26. Dewar Vessels in Calorimetry (Bogorodskii). 2. Voluminometer (Wood, Law). 29.

2. GENERAL AND PHYSICAL CHEMISTRY.

JOHN JOHNSTON.

Bicentenary Anniversary of M. V. Lomonossov's Birthday. B. N. Menshutkin. *Chem. News*, 105, 73–5, 85–7. E. J. C.

Nineteenth Annual Report of the Committee on Atomic Weights. Determinations Published during 1911. F. W. Clarke. *J. Am. Chem. Soc.*, 34, 225–32. E. J. C.

Some Remarks on the Value of the Volumes of the Coexisting Phases of a Simple Substance. J. D. van der Waals. *Proc. Akad. Wetenschappen*, 13, 1253–62.—Mathematical. D. A. MacInnes.

Methods of Balancing Chemical Equations. F. B. Wilson. *Met. Chem. Eng.*, 10, 94–5. W. D. Harkins.

A Simple Relation between the Coefficient of Dilation of a Liquid and the Temperature. Marcel Oswald. *Compt. rend.*, 154, 61–3.—A mathematical note on the experimental verification of the formula of Thorpe and Rücker (*J. Chem. Soc.*, 1884, 135). W. D. Harkins.

The Latest Progress in Optical Pyrometry. Arthur Lenk. *Met. Chem. Eng.*, 10, 183–4. E. J. C.

Simple Lecture Experiments. P. L. Mercanton. *Physik. Z.*, 13, 85–6.—(1) The heat effects produced by tension and compression can be shown by soldering thermal junctions to the opposit sides of a metal bar. When the bar is bent, the heat effect, which is such as to oppose the change in form, is a cooling on the outside, a warming on the inside of the bar, and this is indicated by the reading of the thermo-element arranged differentially. A moving coil galvanometer of 100 Ayrton units

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sensitiveness is sufficient. (2) The effect of heat on the coeff. of viscosity of fluid can be shown by timing the outflow from 2 equal vessels, and then repeating with hot fluid in one vessel. W. P. WHITE.

The Fusion of Carbon by means of the Joule Effect. M. LA ROSA. Univ. Palermo. *Ann. Physik*, 36, 841–7.—R. considers that the C rods used in his expts. (*C. A.*, 5, 2012) were purer than those used by Watts and Mendenhall, (*C. A.*, 5, 3363) since he treated the rods with Cl at 900° for 9 hrs., and only 0.07% ash remained. These pure rods, when heated by the Joule effect, show every evidence of actual fusion, while the increase of plasticity observed at a somewhat lower temp. by W. and M. was probably due to impurities. The protuberances observed by the latter were probably due to a sublimation of the impurities, and are very different from the little spherules of graphite described by R. W. D. HARKINS.

The Resistance Encountered by Small Spheres Slowly Moving through Air. MARTIN KNUDSEN AND SOPHUS WEBER. Univ. Copenhagen. *Ann. Physik*, 36, 981–94.—The formula of L. W. McKeehan for the resistance, K, of a small sphere of radius R moving with const. velocity, v, through a medium of viscosity η may be written: $K = 6\pi\eta Rv(1 + A\lambda/R)^{-1}$, where A, according to McKeehan, equals 1. K. and W. find that $A = 1$ only when R/λ is small; in general $A = 0.68 + 0.35\ e^{-1.85\ R/\lambda}$; when R/λ is large, results very different from those of McKeehan are obtained. L. H. ADAMS.

Theory of Refraction Constants. OTTO WIENER. *Ber. Sächs. Ges. Wiss.* (*Math. phys. Kl.*), 62, 256–77 (1910); *Chem. Zentr.*, 1911, I, 456.—Formulas for the calc. of the dielec. const. (ε) of mixts. are also applicable to the calc. of refraction consts., so long as the inhomogeneities of the mixt. are small as compared with the wave length. For 2 homogeneous substances forming a mixt. in which the particles are equidistant and of similar shape, the formula is derived:

$$(\varepsilon_m - 1)/(\varepsilon_m + u) = \delta_1(\varepsilon_1 - 1)/(\varepsilon_1 + u) + \delta_2(\varepsilon_2 - 1)/(\varepsilon_2 + u)$$

which expresses the dielec. const. of the mixt. (ε_m) in terms of those of the components (ε_1, ε_2), and the ratio (δ_1, δ_2) of the vols. of the components to the total vol. u is a factor which depends upon the shape of the particles; according to the Lorenz-Lorentz formula it is 2 for spherical particles in a vacuum. u may be detd. for chem. compds. from the values of d and n for liquid and vapor; hence one may draw conclusions as to the shape of the particles. For H_2S and CS_2 u deviates considerably from 2, while according to their constitutional formulas the shape of the particles is far from spherical. In the series of normal alcs. u increases with the length of the chain, as is to be expected. Of 2 isomers (*e. g.*, *n* and iso-PrOH) that with the more symmetrical mol. has the smaller u. For H_2O, $u = 4.96$, which is greater than the theoretical max. value 3.6); this is attributed to polymerization. The formula $(n - 1)/d =$ const. is a special case of the author's formula, which would hold for certain deviations from spherical form. While a single substance (vapor) is a binary mixt. of vacuum and mols. of one kind, a liquid mixt. is a ternary system composed of vacuum and 2 mol. species. The theory for this case is also developed. The advance made here over previous empirical alterations of the Lorenz-Lorentz formula is in the strict derivation and theoretical interpretation of u. J. JOHNSTON.

A General Relation between the Physical Properties of a Substance; Application to Viscosity, Surface Tension, Heat of Vaporization, Etc. G. TER GAZARIAN. *Compt. rend.*, 153, 1071–4.—It is shown that the relation developed in a previous paper (*C. A.*, 6, 560), will express, with considerable accuracy, the relations between the coeffs. of viscosity, the surface tensions, the heats of vaporization, and the Mathias-Cailletet "rectilinear diameters" of different liquids. No new exp. data are presented.

D. A. MACINNES.

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Oscillatory and Uniform Motion of Liquids in Cylindrical Tubes. Viscosity. M. MENNERET. *J. physique*, [5] 1, 753–66, 797–804.—Theoretical. L. H. A.

The Measurement of Very Small Gas Pressures. C. F. HALE. *Trans. Am. Electrochem. Soc.*, 20, 243.—The principle of the Pirani manometer (*Ber. physik. Ges.*, 1906, 686), depends upon the fact that at low pressures the heat cond. of gases is a function of the pressure. It is only necessary therefore, to observe the effects of varying heat dissipation with pressure changes, upon some source of heat within the vessel undergoing evacuation. Pirani accomplished this by connecting to the system an ordinary Ta lamp. The wire in this lamp was heated by a constant-voltage current. A better instrument was obtained when the Ta wire was replaced by Pt and the wire was clamped tightly to the anchor wires in order to keep const. the heat loss through the supports. In simplicity both of construction and of operation, involving only current and resistance measurements within the range of instruments readily accessible, this manometer recommends itself at once, but in point of sensitiveness to pressure changes it is somewhat disappointing. H. has modified the Pirani manometer so as to increase its sensitiveness quite materially. The improved manometer, which is described in detail, is found to give reliable measurements of pressure down to 0.00001 mm. Hg. Since the heat cond. varies with the nature of the gas, it is necessary to calibrate the manometer with the same gas with which it is to be employed subsequently. Calibration curves are given for pure dry air and for H. W. E. RUDER.

Thermal Conduction and Convection in Gases at Extremely High Temperatures. I. LANGMUIR. *Trans. Am. Electrochem. Soc.*, 20, 225.—L. describes a series of expts. on the formation of NO from air in contact with a glowing Nernst filament. A dissociation of the gas mols. into atoms or an absorption of energy by the emission of ions from the hot surface are possible causes. The Nernst glower, however, is not suitable for such expts., because the range of temp. is limited. The expts. were therefore continued with ductil W wire in H. Some of the results obtained follow: The energy required to heat the wire to a given temp. is very nearly independent of the size of the vessel containing the H. "The loss of energy was found to increase very rapidly with increasing temp. Up to about 1300° K. the energy increases in prop. to a power of the temp. between the 1st and 2nd but above that it increases more rapidly until at 3400° K. it is actually increasing faster than T^{10}. In a vacuum the energy loss varies as $T^{4.6}$, and this exponent is const. over a very wide range, So, for a wire of about 0.045 mm. diam., heated in H, the ratio of radiated to total energy reaches a max. at about 2600° K. At this temp. however, only about 9% of the total energy is lost by radiation, while 91% is carried away by conduction through the H. At 1000° K. the proportion of radiated energy is about 0.7%, and at 3400° it is 3.4% of the total energy. The most reasonable explanation of the very large heat cond. of these gases at these extremely high temp. seems to be that the mols. dissociate into atoms close to the filament, thereby absorbing a large amt. of heat. The atoms then diffuse away from the wire, and there, because of the lower temp., recombine and give up the heat that was absorbed from the wire. Expts. are now in progress to det. the energy loss of a W wire heated in monatomic gases, as Hg vapor. C. p. measurements indicate that the m. p. of W is at least 3450° K. Pirani had found 3570° by a very unsatisfactory method, but the best value up to that time. The one that even now seems to be generally accepted, is that of von Wartenberg, 3170° K." The discrepancy of a W filament from a thermodynamically black body, and the advantage of detg. the m. p. of W in H were pointed out in discussion. W. E. RUDER.

Measurements of Specific Heat at Low Temperatures. ALEXANDER S. RUSSELL. Univ. Berlin. *Physik. Z.*, 13, 59–65.—By means of the Nernst-Koref-Lindemann Cu calorimeter (*C. A.*, 4, 2396) the mean sp. heats of the following substances were detd.

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over the approx. ranges 45° to 0°, 0° to —78°, and —78° to —190°: —CuO, PbO, MgO, HgO, Fe_2O_3, Cr_2O_3, As_4O_6, Al_2O_3, Sc_2O_3, CeO_2, ThO_2, PbO_2, MnO_2, U_3O_8, WO_3, Tl, Si (cryst.), Si (amorphous), Hg, HgS, CuS, Sb_2S_3, CdS, NaCl, KCl, TlCl, SiC. From these data the conclusion is drawn that Kopp's law (mol. heat capacity of a compd. equals sum of at. heat capacities of components) does not hold at low temp. where the Dulong and Petit law does not hold. Or expressed in terms of the new theories of sp. heat, the frequency of vibration of an atom in a compd. is not the same as in the free state. The most striking illustration of this failure of Kopp's law is the fact that the mol. heat capacity of SiC at 138° abs. is less than the at. heat of Si. GRINNELL JONES.

The Linear Expansion of the Solid Elements as a Function of the Absolute Melting Point. A. STEIN. Grimma i/S. *Z. anorg. Chem.*, 73, 270–3.—S. points out that the product of the abs. m. p. T_s and the linear expansion of the at. vol. $(\alpha \sqrt[3]{v})$ is a const. for all metals: $T_s\ \alpha \sqrt[3]{v}$ = const. GRINNELL JONES.

The Relation between the Density and the Index of Refraction in Solid, Crystallin, Isomeric, Organic Compounds. K. HEYDRICK. Jena. *Z. Kryst. Min.*, 48, 243–305.—With increasing d. the mean index of refraction in all isomeric groups increases. The laws of Landolt that the grouping of the atom in the mol. of metameric substances has only a slight influence on the value of $(n-1/d)$, but that for polymeric substances the denser substance has a lower value of $n-1/d$) holds good for cryst., organic compds. The dispersion for the av. n is about the same for position isomers. The relative dispersion is about the same for members of such an isomeric group, but not for metamers in a broader sense nor for polymers. Landolt's law applied to minerals indicates that calcite and aragonite are polymeric; rutile, brookite, and anatase are metameric; andalusite and cyanite are metameric, but sillimanite is polymeric to the other 2. Link's law of rationality holds for metameric and polymeric org. compds. The 2 dinitrotoluenes (1.2.4 and 1.2.6) stand in approx. morphotropic relation as do also the polymers dicyanodiamide and melamine. The hydrous K *o*-phenolsulfonate and the anhydrous K *p*-phenolsulfonate have the optic relations of position isomers. The paper also presents original crystallographic data for a number of org. compds. E. S. LARSEN.

Dimorphism of Ammonium Salts. E. SOMMERFELDT. Tübingen. *Z. Kryst. Min.*, 48, 515–7. E. S. LARSEN.

The Heat of Combustion of a Molecule and its Chemical Attraction Constant. R. D. KLEEMAN. *Proc. Camb. Phil. Soc.*, 16, 299–312; cf. *C. A.*, 5, 12, 13, 3746.—According to K. the attraction between 2 atoms of at. wt. m_1 and m_2 is proportional to $\sqrt{m_1 m_2}$; the attraction const. of an atom is $\sqrt{m}$; that of a mol. is $\Sigma\sqrt{m}$. This paper is a statistical study of relations between heat of combustion (h) and $\Sigma\sqrt{m}$ for a large number of org. compds. For example, for compds. containing C, H, and n atoms O, it is found that $(h + 50.7\ n)/\Sigma\sqrt{m} = 29.5$ approx., where $\Sigma\sqrt{m}$ is the sum of the square roots of the at. wts. of H and C atoms in a mol. of the substance. Similar relationships are derived for organic compds. containing nitro or amido groups, S, Cl, etc. J. JOHNSTON.

The Relation of Viscosity to other Physical Properties. I. Ethylene and Acetylene Compounds. T. P. HILDITCH AND A. E. DUNSTAN. *Z. Elektrochem.*, 17, 929–34; cf. *C. A.*, 5, 2767.—A discussion of the influence of various chem. structures on phys. properties, *e. g.*, (1) proximity of 2 or more unsatd. groups in the mol., (2) satd. or unsatd. cyclic chains, (3) the differences in effect of corresponding derivs. of hydroaromatic and aromatic compds., (4) mol. symmetry, with or without the presence of unsatd. groups, (5) the independence of viscosity of the universal type of at. arrangement. Numerous figures and tables are given in substantiation of claims.

J. S. GOLDBAUM.

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The Methane Equilibrium. JOHN N. PRING AND DORIAN M. FAIRLIE. Univ. Manchester. *J. Chem. Soc.*, 101, 91–103; *Proc.*, 27, 305.—The reaction between C and H was investigated at high gaseous pressures, in order to find the equil. values at high temps., and to learn the effects of pressure upon the synthesis $C + 2H_2 = CH_4$. The high pressure hastens greatly the attainment of the equil. value, even in the absence of a catalyst; the disturbance of the equil. due to the formation of ethylene was greatly diminished by the rapid cooling caused by the water-cooled steel walls of the reaction vessel. The expts. up to 100 atm. were carried out in the pressure furnace of Hutton and Petavel (*C. A.*, 2, 1660), while for those from 100 to 200 atm. a new form of furnace of smaller capacity was constructed. With pressures between 30 and 50 atm. equil. was reached in about 2 hrs. at 1200–1300°, and in 15 min. at 1400°, either with or without a catalyst. At 200 atm. the reaction was still more rapid. This indicates that finely divided C would at still higher pressures unite with H_2 with extreme rapidity, since the reaction is exothermic, and thus the method might be used for the prep. of CH_4 on a large scale. CH_4 is the only satd. hydrocarbon formed between 1100° and 2100° with pressures up to 200 atm. In the expts. between 10 and 200 atm. the values of the ratio of the partial pressures of CH_4 and of H were const., when the same modification of C was used. At 1200°, 0.24% and at 1500°, 0.07% of CH_4 is in equil. with H and graphite. For amorphous C the corresponding values are 0.36% and 0.21% for the "metastable equil." Thus, the change of free energy of the transformation of C into graphite increases rapidly between 1200° and 1600°. The mean sp. ht. of amorphous C is thus higher than that of graphite between 0° and 1200°. The values of the equil. consts. obtained in this work will probably give by calculation more accurate values of the relative sp. hts. of C and graphite, and of C, H, and CH_4 at these high temps. than could be obtained by any direct measurements.

W. D. HARKINS.

The Dielectric Constants and Long Wave Refringence of Binary Mixtures. A. SCHULZE. *Z. Elektrochem.*, 18, 77.—Indirect proof of Dolezalek's vapor pressure law. S. measures the dielec. consts. and refringence of 4 pairs of binary liquid mixts., *viz.*, Et_2O–$CHCl_3$; C_6H_6–CCl_4; C_6H_6–$CHCl_3$ and C_6H_6–Et_2O. App. for the measurement of dielec. consts. and method of calc. this const. are described. S. shows that the Lorenz mixt. formula "furnishes a good means of detg. mol. relations in mixts." The data lead to constitutions of binary mixts. similar to those deduced from the vapor pressure law and substantiate the latter. The claim that at sufficiently high temps. all mixts. become ideal since association and the union of mols. cannot take place, is also substantiated.

J. S. GOLDBAUM.

The Polymorphism of Allocinnamic Acid. J. MEYER. *Z. Elektrochem.*, 17, 976.—Allocinnamic acid is the *cis* form of the ordinary *trans* acid $C_6H_5CH : CHCOOH$. It exists in 3 polymorphic chem. identical modifications with m. p. 42°, 58° and 68°. The prep. of these in purest state is described and their cryohydric pts. detd. From the solubility curves the heats of soln. were detd.; they are approx. identical, so that the heats of transformation are small. M. also tried to det. the heats of conversion directly, through the heats of combustion, of fusion and of soln. The heats of transformation are so small that they cannot be accurately detd. The f. p. detns. give cryohydric pts. which harmonize with the solubility curve. The mol. wts. calc. therefrom approach in all 3 isomers the value 148. Measurements of the cond. of the satd. and dil. aq. solns. of the 3 modifications give identical cond. consts. which coincide with those found by Bjerrum. In disagreement with the views of Stobbe, M. believes as a result of several hundred spontaneous recrystns. of these acids that they are completely identical and polymorphous. Further investigation is needed to establish whether they are monotropic or enantiotropic.

J. S. GOLDBAUM.

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Heats of Combustion and Conversion of the Cinnamic Acids. W. A. ROTH. *Z. Elektrochem.*, 18, 99.—Corrections of data complied by R. in paper published by J. Meyer (see preceding abstr.). Recalculation of values as given was found necessary; the present paper gives more reliable figures, although the change does not affect the general result reached by Meyer. J. S. GOLDBAUM.

The Solubility of Carbon Dioxide in Water and some other Solvents under High Pressures. WILHELM SANDER. Göttingen. *Z. physik. Chem.*, 78, 513–49.—The solubility of CO_2 from 20 to 140 kg./qcm. increases more quickly with the pressure than corresponds to Henry's law when the solvent is EtOH, PrOH, C_6H_6, PhCl, PhBr, $PhNO_2$, and PhMe, and more slowly when the solvent is Et_2O, EtOAc, and H_2O. The best agreement is given when the calculations are made on the basis of the vol. of the soln., and also at the higher temps. In $C_6H_5NO_2$ the solubility is as great at 100° as at 60°. The solubility in chemically related solvents decreases with increasing mol. wt. W. D. HARKINS.

Solutions of Liquids with a Critical Temperature. E. MOLES. Madrid. *Anales soc. españ. fis. quim.*, 9, 157–72.—M. has completed the vapor pressure, surface tension and f. p. data of the systems H_2O-isobutyric acid and H_2O-phenol by detn. of the vapor pressures (using the dynamic isoteniscope of Smith and Menzies) at 5° intervals between 20° and 40°, and of the surface tension at 20° and 40° (by method of capillary rise) for the system H_2O-isobutyric acid, as well as the f. p. curve of the system H_2O-phenol. H. S. PAINE.

The Latent Heats of Vaporization of Mixed Liquids. II. DAN TYRER. Univ. Manchester. *J. Chem. Soc.*, 101, 81–90; *Proc.*, 27, 319.—The latent heats of vaporization "at const. pressure" and "at const. comp." (*C. A.*, 6, 315) were detd. for mixts. of CCl_4 and Et_2O, $CHCl_3$ and C_6H_6, CCl_4 and AcOEt, EtBr and C_6H_6. The latent ht. of a mixt. at const. pressure does not seem to bear any simple relation to the comp., and is not an additive property, but the latent ht. at const. comp. approximates closely to a linear function of the comp. Trouton's law $LM/T = k$ holds only for the latent ht. at const. comp. The validity of this equation for these mixts. proves that they are normal mixts., without association or dissociation. W. D. HARKINS.

Theory of Solubility. D. TYRER. Univ. Manchester. *J. Physic. Chem.*, 16, 69–85.—The solubility of a substance depends upon temp., and conc. of the solvent (*C. A.*, 4, 1563, 3159), and upon the nature of the solvent and solute. The ordinary solubility curve is arbitrary and meaningless, since it represents neither the solubility at const. solvent conc. nor at const. pressure, except below the b. p. An equation is given expressing the relation between the solubility, the sp. vols. of the pure solvent and solute, and the sp. vol. of the solute in the soln. W. D. HARKINS.

The Solubility of Electrolytes in Aqueous Solutions. II. Solubility of Oxalic Acid in other Acids. JAMES I. O. MASSON. Univ. Edinburgh. *J. Chem. Soc.*, 101, 103–8; *Proc.*, 27, 328.—The solubilities of $H_2C_2O_4$ in aq. HNO_3, and in HCl, and of β-naphthalenesulfonic acid in aq. HCl, were detd. at 30°. Both of the solubility curves for $H_2C_2O_4$ are U-shaped and are portions of conic sections. The equation (*C. A.*, 6, 444) involving the assumption of const. mol. vol. in soln. has again been found valid. W. D. HARKINS.

Affinity Effects in Solution Processes. M. ROZSA. *Z. Elektrochem.*, 17, 934.—A substance *C* is insol. or slightly sol. in *A* but quite sol. in *B*. If *C* is dissolved in the compound medium *AB* the f. p. of the latter is elevated if combination between *B* and *C* occurs. Raoult's method of detg. f. p. is used. This method indicates mol. combination in the following systems: EtOH-H_2O, PhOH-H_2O, EtOH-$C_2H_4(OH)_2$, EtOH-

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lactic acid, $PhOH\text{-}C_3H_5(OH)_2$, $PhOH\text{-}CH_3CHOHCOOH$, $H_2SO_4\text{-}H_2O$, $SnCl_2\text{-}H_2O$. Complete tables are appended. J. S. GOLDBAUM.

Dependence of the Conductance of Binary, Normal Electrolytes upon the Concentration. PAUL HERTZ. Heidelberg. *Ann. Physik*, 37, 1–28.—H. considers the possibility that the mobility of the ions may change with the conc. of the electrolyte to such an extent that the abnormal behavior of strong electrolytes may be either partly or wholly explained in this way. A mathematical treatment is given of the motion of the ions under the influence of the attraction of the other ions, and also of the imposed elec. field. These 2 influences cause the path of the ions to be hyperbolic in form. The effects of impacts with the mols. of the solute and solvent, are also considered. A formula is developed giving the dependence of the cond. upon the conc.; this is in good agreement with experimental data for Na^+, K^+, and Li^+. In the development of the equations no good agreement was found when the at. wts. were used to represent the masses of the ions; arbitrary consts. were therefore used. This may possibly be due to hydration of the ions. W. D. HARKINS.

A Special Case of Heterogeneous Equilibrium. P. P. FEDOTIEFF. *Z. anorg. Chem.*, 73, 173–99.—In order to study the equil. $Cu(NO_3)_2 + PbI_2 = Pb(NO_3)_2 + CuI + I$, F. dets. the comp. of solns. in equil. with the solid mixts.: $Pb(NO_3)_2$, CuI, I_2; $Pb(NO_3)_2$, PbI_2; and PbI_2, CuI, I_2. The system containing $Cu(NO_3)_2$, CuI and I_2 as solids was found to be unstable owing to the formation of $CuNO_3$, which decomposed. When PbI_2, CuI and I_2 were present as solids the mass law "const." $K = [Cu]/[Pb]$ changed from 10 to 74 when the NO_3 conc. was varied from 1–3 N ([Cu] and [Pb] are the concs. in the soln.). Potentials of cells of the form: Pt | solid PbI_2, I_2 | $Pb(NO_3)_2$ soln. | KNO_3 soln. | $Cu(NO_3)_2$ soln. | solid CuI, I_2 | Pt were detd. over a range of salt concs. With the formula, $E = RT/2F \log K$, values of E were calc. which agree with the expt. detns. if the values of K from the expts. above corresponding to the same total NO_3 concs. were used. As the solubility of PbI_2 in water increases on the addition of I_2, a detn. of the e. m. f. of the cell Pt | PbI_2, I_2 | KNO_3 soln. | HgCl | Hg was made. This indicated a higher conc. of I^- than exists in a soln. satd. with PbI_2 alone, so F. concludes that the equil. $Pb^{++} + I_2 = Pb^{++++} + 2I^-$ is present. This is suggested as a method for the detn of the potential of the $Pb^{++} \longrightarrow Pb^{++++}$ electrode. D. A. MACINNES.

Piezochemical Studies. VIII. The Influence of Pressure on Affinity. II. G. TIMOFEEV. *Z. physik. Chem.*, 78, 299–320.—Measurements were made of the effect of pressures up to 1500 atm. on the e. m. f. of the cells: (1) 30% Pb amalgam | satd. $PbCl_2$ soln. | HgCl | Hg; (2) 30% Pb amal. | satd. $PbCl_2$ soln. | Pb; (3) 1% Pb amal. | satd. $PbCl_2$ soln. | HgCl | Hg, and (4) 30% Pb amal. | satd. $PbCl_2$ soln. | 1% Pb amal. The e. m. f. changes observed, which were always less than 3 millivolts, can be expressed within a few % by the formula: $E_p - E = p(V_1 - V_2)$, (E_p and E are the e. m. f. of the cells with and without application of the pressure p, and ($V_1 - V_2$) is the vol. change on passing 1 equiv. of electricity). In order to calc. ($V_1 - V_2$) the sp. grs. of Pb, $PbCl_2$, and HgCl and of Pb amalgams of comps. between 5 and 50% were detd., all at 25°. D. A. MACINNES.

Electrification by Contact. A. GRUMBACH. *Ann. chim. phys.*, 24, 433–501.—A study of the influence of sol. nonconductors on the contact e. m. f. at the surface of sepn. between a dielec. and an electrolyte. G. measures the e. m. f. produced when solns. of KCl containing the sol. nonconductor are filtered under different pressures. The replacing of a given wt. of H_2O in a salt soln. by an equal wt. of MeOH, EtOH, BuOH, PhOH, results in a diminution of the moment of electrification (($M = Eh/P\rho$, where E = e. m. f. produced, P = pressure, h = viscosity, ρ = resistivity). G. derives

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a formula expressing his results, and concludes that electrification by contact is connected with adsorption. GEORGE W. MOREY.

Colorimetric Investigation of the Action of Neutral Salts. BOHDAN VON SZYSZKOVSKII. Univ. Kiev. *Z. physik. Chem.*, 78, 426–89.—Weak acids, such as AcOH, and strong acids, such as HCl, give different colors with Me orange; at the same H^+ concs. AcOH gives the stronger color up to 1.10^{-3} mols per l.; above this conc. the reverse is true. Nonelectrolytes do not exert a perceptible influence upon the sensitiveness of Me orange; neutral salts increase the sensitiveness. The latter influence is due to a change in the degree of dissociation of the Me orange due to the effect of the neutral salt as well as to the formation of complexes between the 2.
W. D. HARKINS.

The Influence of Inactive Electrolytes on the Optical Activity of *l*-Malic Acid in Aqueous Solution. CLIFFORD M. STUBBS. Univ. Liverpool. *J. Chem. Soc.*, 99, 2265–86; *Proc.*, 27, 225.—Solns. of malic acid were prepd. by weighing out the anhydrous acid. The addition of electrolytes in general exerts a large influence upon the rotation, which is nearly proportional to the amt. of electrolyte added, is mainly a sp. additive property of the ions, and appears to be related to the valency of the ions and the order of their electro-affinities. The effect of the inactive electrolyte seems to be due to a power of influencing the asymmetry of the active mols. without entering into chem. combination with them. Expts. show that "the influence of the salt on the sp. rotation depends mainly on the conc. of the soln. with respect to that salt, and not on the conc. of the malic acid." S. could find no parallelism between the salt effects and any other physical properties of the solns. It seems plausible that the mode of influence may be connected with the sensitiveness of the OH group in the malic acid.
W. D. HARKINS.

Chemical Equilibrium in Solution. R. DUBRISAY. *Compt. rend.*, 153, 1076–8.—Detns. of the effect of the addition of acetone on the solubility of $Bi(NO_3)_3$ in HNO_3 solns. were made, and a decrease of solubility on increasing the conc. of acetone was observed. From these and similar expts. it is concluded that the law of mass action is not rigorous except for very dil. solns., as the potential of a substance in soln. is modified by the presence of other substances. D. A. MACINNES.

The Electrochemistry of Solutions in Acetone. ALEXANDER ROSHDESTWENSKY AND WILLIAM C. MCC. LEWIS. Univ. Coll., London. *J. Chem. Soc.*, 99, 2138–47; *Proc.*, 27, 266.—The sp. cond. of acetone is 6×10^{-7} at 18°. Walden's expression, $\Lambda_0\eta = k$, and that of Kohlrausch, $\Lambda_v = \Lambda_0 - a\sqrt[4]{c}$ give values of Λ_0 which are much too high. Λ_0 for $AgNO_3$ in acetone is taken as 151, on the basis of Laszczynski's rule that the values of Λ_0 for simple salts in acetone are 1.3 times the values in aq. soln. This is not very different fron the detd. values (Dutoit and Levier) for the alkali bromides and iodides (155–60°). The Ostwald diln. law does not hold, but the Rudolphi formula gives consistent results. Thus the dissociation is that of a weak, but the behavior, that of a strong electrolyte. In the case of $LiNO_3$, the diln. law holds for concs. less than 0.01 *N.*, even though the dissociation is greater than for $AgNO_3$. The e. m. f. of a $AgNO_3$ conc. cell in acetone, arranged so as to give liquid | liquid p. ds. as well as those at the electrodes, agrees quant. with the Nernst formula, the transport no. for NO_3 being taken as 0.62. If a satd. soln. of $LiNO_3$ is put between the 2 $AgNO_3$ solns. the liquid p. d. is increased by several millivolts. W. D. HARKINS.

The Theory of Critical Opalescence. WOLFGANG OSTWALD. *Ann. Physik*, 36, 848–54.—From mol. kinetic considerations Smoluchovski, and also Einstein, developed the theory that the phenomena of opalescence in the region of the critical point, are caused by positive or negative local changes in d., and that the intensity of the opal-

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escence should be inversely proportional to the difference between the temp. of observation and the critical temp. This was found by W. H. Keesom (*C. A.*, 5, 3362) to be true for C_2H_4, except for temps. exceedingly close to the critical temp. The exact measurements of Friedländer (*Z. physik. Chem.*, 38, 415) on aq. solns. of isobutyric acid also accord with the theory to the same degree. The intensity of the opalescence at temps. extremely close to the critical temp. was, however, much too great. At such temps. the local regions of abnormal d. may reach dimensions greater than those of light waves, and thus bring into play optical factors (refraction and reflection) which were not taken into account by Smoluchovski. In 1906 the writer classed critical opalescence as a phenomenon characteristic of a disperse system. W. D. H.

Fused Salts as Solvents. I. Cryoscopic Investigations. O. Sackur. Univ. Breslau. *Z. physik. Chem.*, 78, 550–63.—Measurements were made on solns. in the following salts as solvents: KCl, NaCl, Na_2SO_4, $CaCl_2$, $SrCl_2$, $BaCl_2$, and a few measurements with Na_2CO_3 and K_2CO_3. The laws of dil. solns. were found to hold up to 1 *N*. Dissolved salts which have an ion in common with the solvent show the normal mol. wt. or a smaller one, and a dissociation independent of the conc. When there is no common ion the depression of the f. p. is 2 to 3 times the normal depression. Many of the salt mixts. form solid solns. **II. Solubility Determinations.** *Ibid.*, 564–72.—The solubilities of a large no. of salts in the solvents listed under I were detd. All of the substances are sol. which can dissociate into 2 oppositly charged ions, while all substances which are not dissociable are also not sol., unless they react with the solvent to form sol. substances. The oxides of the alk. earths form an exception to this rule, since they dissolve easily in chlorides which have a common ion. W. D. H.

Thermal Analysis in Quaternary Systems. I. N. Parravano and G. Sirovich. *Gazz. chim. ital.*, 41, II, 697–717; cf. *C. A.*, 6, 16, 178. Chas. A. Rouiller.

Fusion Experiments with Bisilicates and Titanates. S. Smolenskii. St. Petersburg. *Z. anorg. Chem.*, 73, 293–303.—The fusion curves of the following binary mixts. were investigated: $CaSiO_3$–$CaTiO_3$, $BaSiO_3$–$BaTiO_3$, $MnSiO_3$–$MnTiO_3$. The products were made by fusing the proper amts. of SiO_2, TiO_2, $CaCO_3$, $BaCO_3$, or $MnCO_3$, in a "Morgan" C crucible heated in a Kryptol resistance furnace. Temps. were measured by means of a Pt–PtRh thermocouple which was calibrated at the f. ps. of Ni, Cu and Sb, these points being taken as 1484°, 1084° and 632°, resp. The thermocouple was protected by a porcelain tube which was itself sepd. from the charge by a thin sheet of Pt. The mixts. were first melted, then analyzed; after a 2nd m., their cooling curves, through a large temp. range, were observed. Microscopical exams. of many of the products were also made. The f. ps. of the pure components are: $CaSiO_3$, 1512°; $MnSiO_4$, 1218°; $MeTiO_3$, 1404°; $BaSiO_3$, 1470°; ($CaTiO_3$ and $BaTiO_3$ not detd.). The system $CaSiO_3$–$CaTiO_3$ was studied for mixts. containing up to 75% $CaSiO_3$ and proved to be an isomorphous series corresponding to Roozeboom's Type II. At temps. somewhat below the solidus curve a 2nd liberation of heat was observed and was shown to be due to the splitting up of the solid soln. into 2 phases. The f. p. curve of the system $MnSiO_3$–$MnTiO_3$ shows a eutectic at 22.3 mol. % $MnTiO_3$ and solid soln. from 38.3 to 100 mol. %. Here also the solid soln. which seps. out from the melt breaks up at a lower temp. (about 1050°) into its components. The system $BaSiO_3$–$BaTiO_3$ was found to present many complications, and the various transformations involved are not yet entirely cleared up. Incidentally, artificial titanite ($CaTiSiO_5$) was prepared; its f. p. is 1221°. L. H. Adams.

The Determination of the Absolute Value of the Viscosity of Silicate Melts. C. Doelter and H. Sirk. *Monatsh.*, 32, 643.—The method of Arndt (*C. A.*, 2, 936) was applied to the detn. of the viscosity of a melt of an impure synthetic diopside, containing Fe and Al. The melt was contained in a Marquardt crucible heated by a

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Pt furnace, the temp. being read with a thermoelement placed between the crucible and the inner walls of the furnace. The detns. were made at temps. varying from 1280° to 1300°. The app. was calibrated by a detn. of the viscosity of castor oil at 23°, the abs. value of which is known. The viscosity in c. g. s. units varied from 33 at 1300° to 106 at 1280°. J. L. CRENSHAW.

The Influence of Neutral Solvents on Velocity of Reaction. I. Transformation of Anis-*syn*-aldoxime in Various Solvents. THOMAS S. PATTERSON AND HARVEY H. MONTGOMERIE. Univ. Glasgow. *J. Chem. Soc.*, 101, 26–39; *Proc.*, 27, 276.—The solvents used were: H_2O, MeOH, EtOH, *n*-PrOH, iso-BuOH, allyl and benzyl alcs., C_6H_6, PhMe, *o*-, *m*-, and *p*-$C_6H_4(Me_2)$, $PhNO_2$, and mesitylene. The solvents influence quite different reactions in the same manner, though often in an opposit direction. Thus a given set of solvents may hasten a particular reaction in a certain sequence, while in very nearly the same sequence they retard another reaction. W. D. HARKINS.

The Velocity of Interaction of Iodic and Sulfurous Acids in Various Media. T. S. PATTERSON AND WILLIAM C. FORSYTH. *J. Chem. Soc.*, 101, 40–1; *Proc.*, 27, 320.—The interaction of these acids when in H_2O is hastened considerably by adding MeOH; it increases to a max. and then decreases greatly on adding acetone. W. D. H.

Further Remarks on the Question of Rate of Crystallization and of Solution. C. L. WAGNER. *Z. Electrochem.*, 17, 989–90.—A continuation of the discussion between R. Marc and W. (cf. *C. A.*, 5, 1865). W. reiterates his former criticisms of Marc's work and introduces new arguments in favor of his side of the question. L. H. ADAMS.

Influence of Impurities on the Lower Limits of Crystallization. M. PADOA AND L. MERVINI. *Gazz. chim. ital.*, 41, I, 198–203; see *C. A.*, 4, 403. J. J. M.

Solutions of Dyestuffs (Diffusion of Colloids). III. R. O. HERZOG AND A. POLOTSKY. *Z. Electrochem.*, 17, 679–84.—Continuing Herzog's work on the diffusion of colloids, the authors have detd. the diffusion coeff. of the following dyes in aq. soln.: I. Chromotrop, acid black, safranine, ponceau 3 R; II. toluidine blue, methyl violet and guinea green; and of the following in 5% gelatin soln.: I. Chromotrop, methylene blue, eosin; II. ponceau 3 R, guinea green, erythrosin, Nile blue. Those in group I obey Stefan's formula; those in group II do not. The app. and method of Oeholm (*Z. physik. Chem.*, 50, 309) was used. The diffusion consts. are lower in gelatin than in H_2O; a further increase in the % of gelatin lowers the const. still further. Dialyzed aq. solns. give a lower value than ordinary aq. solns. They conclude (cf. Biltz, *C. A.*, 5, 2998, 3191) that values obtained for the different substances show that the diffusion coeff. is not detd. by the mol. wt. but rather by the no. of atoms and the constitution of the mol. J. L. CRENSHAW.

Measurement of the Dependence of the Brown-Zsigmondy Movement on Temperature. M. SEDDIG. Physik. Inst., Univ. Marburg. *Z. anorg. Chem.*, 73, 360–84.—A cinematographic method which was used to measure the amplitude of the vibration of solid particles suspended in liquid, did not prove to be very accurate, so recourse was had to an ultramicroscopic, photographic method. For the suspension cinnabar powder was used, since the particles obtained when it is used are practically of the same size. The dark lines formed upon the photographic plate do not give the real magnitude of the path of the particle, but only the projection of the path; by a method of approximations, the dimensions of the real paths were calc. The results of the measurements are about 4% higher than those calc. from the Einstein formula, according to which the magnitudes are directly proportional to the square roots of the abs. temps., and inversely proportional to the viscosity of the liquid. The fact

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that the experimental results are somewhat too high, is explained by local overheating of the particles by radiation. The results confirm the hypothesis that the Brownian movement may be explained from the standpoint of the kinetic theory of heat.

W. D. HARKINS.

Variation of Water Vapor Lines in the Solar Spectrum. N. R. GILLIS. McGill Univ., Montreal. *Trans. Roy. Soc. Can.*, [3] 4, (Sect. 3) 45–9 (1910).—The observations so far carried out indicate that the intensity of the lines themselves due to absorptive action of the earth's atm. is mainly a function of temp. and humidity. Considerable variation was observed from day to day, and during the day; the noon readings were usually smallest. The lines were especially intense before storms.

A. T. CAMERON.

Photo-electric Effects of Certain Compounds. A. L. HUGHES. *Proc. Camb. Phil. Soc.*, 16, 376–83.—In an endeavor to find some gas or vapor which could be ionized at ordinary temp. by light of moderately long wave length, H. exposed the vapors CS_2, $SnCl_4$ and $ZnEt_2$ to ultraviolet light from an Hg arc, but found no trace of ionization. For the same amt. of energy, the leak from a surface of Zn or C would be about 10^6 that of the smallest effect which could be measured in these expts. J. J.

The Radiation from the Mercury Arc Lamp. L. GREBE. Bonn. *Ann. Physik*, 36, 834–40.—There is a notable difference between the radiation from gases and from solid bodies, even though qualitatively Kirchoff's law for emission and absorption holds about equally well for both. In order to obtain quant. agreement, a very high temp. of the luminous gas particles must be assumed. In order to shed further light on this question, G. has made a number of photometric measurements, for both the green and the blue Hg line, of the emission and the absorption of 2 Hg lamps placed one behind the other. The results showed that, if it is assumed that the temp. of the arc is proportional to the watt consumption, the relation E/A increases linearly with temp. This conclusion is in agreement with the Rayleigh radiation law, which holds only for large values of λT, that is for either long wave lengths or very high temps. The short waves dealt with here must therefore be emitted by particles of extremely high temp. (about 10,000°) which is in agreement with the considerations set forth above. L. H. ADAMS.

The Ultraviolet Bands of the Carbon Monoxide Spectrum. PETER WOLTER. *Z. wiss. Photochem.*, 9, 361–87.—W. made wave-length measurements of the CO spectrum obtained by d. c. discharge in Geissler tubes containing CO and fitted with a Wehnelt cathode. He concludes that while the results agree approx. with Deslandres' law, the latter does not actually represent the structure of these bands. GEORGE W. MOREY.

Absorption Spectrum of Aniline in the Ultraviolet. HERMANN KOCH. *Z. wiss. Photochem.*, 9, 401–44.—A study of the ultraviolet absorption spectrum of aniline at intervals between 15° and 80°. The spectrum extends further toward the red than that of other benzene derivs. The heads of the bands are toward the violet, from which they shade off toward the red. The character of the spectrum is not influenced by change of temp., pressure, or thickness of the absorbing layer. K. also studied the absorption spectra of EtOH solns. of aniline of various concs.

GEORGE W. MOREY.

The Ultraviolet Spark Spectrum of Air. F. L. WAGNER. *Z. wiss. Photochem.*, 10, 69–89.—The method used was that of photographing the spark spectrum in air of Cu, Ag, and Al electrodes. The lines common to all were taken as air lines, taking care that none were due to impurities common to the 3 metals. A Rowland concave grating of 6.5 m. radius of curvature with 16000 lines to the inch was used. The results are given in tables, which give the wave length of each line, the relative intensity,

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the electrode material with which it was observed, the element to which it is due, and also give the results of previous observers. An appendix gives the spectra of Cu, Al, and Ag, which have been compared with those of Sb, Ca, C, Fe, As, and Pb.
GEORGE W. MOREY.

Measurements in the Silver Spectrum. F. J. KASPER. *Z. wiss. Photochem.*, 10, 53–62.—The arc spectrum was obtained with Ag electrodes, using an induced draught to maintain an adequate O supply. The results are compared with those of previous investigators. GEORGE W. MOREY.

The Band Spectrum of Lead. HERMANN LAMPRECHT. *Z. wiss. Photochem.*, 10, 16–29, 33–52.—The source of illumination was the illuminating gas-O blast, into which the powdered substance was introduced. Identical results were obtained using $PbCl_2$, $PbSO_4$, $PbCO_3$ and PbO, the $PbCl_2$ giving a much more intense flame. The results are compared with those of previous investigations, and also with those calc. by Deslandre's law, with good agreement in 4 series, greater variations in the others.
GEORGE W. MOREY.

Luminescence Analysis by means of the Ultraviolet Filter Lamp. H. LEHMANN. *Physik. Z.*, 13, 35–6.—L. describes an ultraviolet filter lamp for the analysis of luminescent light. G. A. SHOOK.

Absorption Spectra of Phosphorescent Substances. B. WALTER. *Physik. Z.*, 13, 6–11.—Compds. such as CaBiNa, SrBiNa, and BaBiK, etc., show phosphorescent effects. The wave lengths producing the strongest absorption also shows the strongest phosphorescent light. The phosphorescent light does not depend upon the presence of the alkali metal but upon the alk. earth metal. G. A. SHOOK.

Emission Spectra of Solid Aromatic Substances. E. GOLDSTEIN. *Physik. Z.*, 12, 614–20.—A review (cf. *C. A.*, 5, 235, 2772). G. A. SHOOK.

A Relation between the Selective Photo-electric Effect and Phosphorescence. R. POHL. *Ber. physik. Ges.*, 1911, 961–6.—P. points out that the metals of small at. vol. and high valencies, or the compds. in media of high n, show the selective photo-elec. effect where P. Lenard has observed the excitation bands of phosphorescence; and that the wave length of these bands is inversely proportional to the square root of the valency. But the significance of this relation remains uncertain until further research is made upon the absorption of light-energy by phosphorescent substances.
D. W. CORNELIUS.

The Positive Ionization Produced by Phosphates when Heated. FRANK HORTON. *Proc. Camb. Phil. Soc.*, 16, 318–20; cf. *C. A.*, 5, 1555.—Observations have been made of the positive leak from Li_3PO_4 at 800° in air, O, CO and H, at pressures between 0–30 mm.; its general behavior is similar to that of Na_3PO_4, except that the pressure of max. leak is higher with the latter. H. believes, in opposition to Wilson (*C. A.*, 5, 2364) that the property of discharging electricity belongs to the substance itself and not to the material used to support it during ignition. J. JOHNSTON.

Electrification by means of X-rays. C. BEDREAG. Jassy. *Ann. scient. Univ. Jassy*, 7, 53–71; *Chem. Zentr.*, 1911, II, 340.—If X-rays are allowed to fall directly on a metal plate, the plate may become charged to a potential of as much as 10 v. or more, depending on the experimental conditions. The amount of electrification is inversely proportional to the square of the distance, and for the light metals is in the same relative order as the at. wts.; for the other metals the order is the same as that of the Volta e. m. f. series. Investigations on ionization by means of X-rays showed the 2 phenomena to be entirely analogous but not identical. L. H. ADAMS.

Electrical Properties of the Alkali Metals and of Rhodium and Iridium. BRONIEWSKI AND HACKSPILL. *Compt. rend.*, 153, 814–6.—Measurements of the ther-

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mal e. m. f. of the metals Na, K, Rb, Cs, Pt and Ir against Pb between —50° and + 100° were made. A break in the e. m. f. temp. curve was observed at the m. p. of Cs and Rb. Cells of the type: Alk. metal | conc. NH_4Cl soln. | MnO_2 | C; gave approx. 3 v. in each case when Na, K, Rb, and Cs were used as 1 electrode. D. A. MacInnes.

Thomson Effect and Thermal Conductivities at Glowing Temperatures. E. P. Hyde. *Elec. Rev. West. Elec.*, 60, 97.—An investigation by an optical pyrometric method of the conduction of heat away from the glowing filament at the leading-in and anchoring wires, has revealed a difference in the temp. variation along a glowing filament near such a cooling support, depending on the direction of the current through the filament; this difference is to be ascribed to the Thomson e. m. f. The ratios of thermal to elec. cond. at high temps. suggest that W–Ta thermocouples should be 3 or 4 times as sensitive as Pt–Pt–Rh thermocouples. D. K. Wright.

Application of Dewar Vessels to Calorimetry. A. Ya. Bogorodskii. Imp. Univ., Kazan. *J. Russ. Phys. Chem. Soc.*, 43, 1262–8; cf. *C. A.*, 5, 1223, 1857.—A detn. of the heat of soln. of Na_2HPO_4 in a Dewar flask gave —22880 (Thomsen, —22830) cal. A simple heating app. is described for use in detg. sp. heats. It consists of a U-tube having the lower connecting part narrowed down to a diameter of 4 mm. After placing some dil. HCl in the tube, the acid is sucked up into one side and retained there by clamping the rubber connection. A small piece of Mg foil is now dropped into the empty side, and the acid permitted to come in contact with the metal by slowly opening the clamp. The heat evolved is used for warming the calorimeter in which the tube is inserted. 0.7 g. of Mg will raise the temp. of 1000 g. H_2O by 3.161°; the variations are below 0.2%. H. M. Gordin.

The Spark Discharge in a Rarefied Gas, and its Change in a Bundle of Magnetic Rays. A. Righi. *Physik. Z.*, 12, 65–73.—If an external spark gap and a condenser of suitable value are put in series with an exhausted tube, the discharge can be made to preserve the character of a spark at pressures which otherwise would admit only the customary vacuum discharge, with dark space, etc. Such a spark discharge gives off some sort of + and — ions, which are affected by a magnetic field. The discharge itself is spread by a magnetic field, and in the direction of the field.
W. P. White.

The Conduction of Electricity in Saturated Alkali Metal Vapor. Christian Füchtbauer. *Physik. Z.*, 12, 225–8.—F. has previously shown that considerable current may pass between electrodes in satd. Na vapor at temps. as low as 200°, where the vapor pressure is still very small. A similar behavior of Cs vapor has now been observed. A glass app. with Ni electrodes contained the Cs and also He at 196 mm. pressure. The amt. of current which passed between the electrodes at various temps. and p. ds. was detd. At temps. as low as 90° the cond. of the Cs vapor is appreciable; with rizing temp. it increases very rapidly. The observations on the relation of the current passing through the vapor to the impressed e. m. f. at a const. temp. show that up to a certain voltage the plot of this function is nearly a straight line, that is, Ohm's law is approx. obeyed. With higher voltages, ionization comes into play and the current increases with greater rapidity. L. H. Adams.

A Theory of the Zeeman Phenomenon: the Theory of Ritz. A. Cotton. *Rev. gén. sci.*, 22, 597–602.—A general account of the theory advanced by Ritz. J. J.

The Coefficient of Magnetization of Gold. M. Hanriot and F. Raoult. *Bull. soc. chim.*, 9, 1052–6; cf. *C. A.*, 5, 3650. D. A. MacInnes.

The Initial Susceptibility of Nickel as a Function of the Temperature and the Variation of the Point of Magnetic Transformation with Field Strength. D. Radovanovitch. Polytech. Zürich. *Arch. sci. phys. nat.*, 32, 315–37.—R. presents detailed results of a

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study of the variation of susceptibility (ϕ) of Ni (containing about 1.3% Co, 0.7% Fe) with field strength at various temps. If θ is the temp. of magnetic transformation, and H the field strength, $\theta = 359 + 0.198\sqrt{H}$. Below the transformation temp., the initial value of $\phi(\phi_1)$, and the tangent at $H = 0$ to the curves, etc., $\phi = f(H)$ diminish with diminishing temp., but do not vanish until the abs. zero of temp. is reached. Within the temp. range investigated (18°—360°) the initial tangent is proportional to ϕ_1^4. J. JOHNSTON.

Soil Physics (GREEN, AMPT). 15. Conductivity, Salt Content, Hardness, etc., of Water (MERBURG). 14.

3. RADIOACTIVITY.

HERMAN SCHLUNDT.

The Brussels Congress of Radiology and Electricity (Sept. 13-15, 1910). Nomenclature and Radium Standard. O. HAHN. *Verh. phys. Ges.*, 13, 154-8.—As regards nomenclature it was recommended that the time in which the activity of a distinct substance falls to ½ value be called the half value time. Also the term "induced activity" is to be avoided—"active deposit" being preferable. The comparison of fairly large quantities of Ra is now made by means of their γ-ray action, though since the γ-rays of mesothor, which now may be obtained in a highly active form, are less penetrating than those of Ra, the thickness of the Pb used to cut out β rays makes appreciable differences. Another method, much used for balneological purposes in Austria and Germany, is that of measuring the ionization current, a Mache unit being 0.001 of the abs. elec. unit = 3×10^{-13} amp. In other cases the potential fall is measured and for smaller quantities, the Ra content is established from the measurement of the Em. action. Mme. Curie promised to prepare a great standard which should contain 20 mg. of Ra. A method for comparing quantities of from 1 to 2 mg. of Ra accurately with the great standard is to be devized, these smaller quantities to be used as national standards. The question of standards of smaller action, as for example in the measurement of the action of spring waters, is to be considered also. The difficulty in this case lies in the lack of data as to the permanence of weak Ra prep. whose Ra content can be detd. only by the detn. of the Em. The Congress proposes that the quantity of Ra Em. in equilibrium with 1 g. of Ra (element) shall be called the curie (Prof. Boltwood suggests lately that the term curie might well be applied to the equil. amts. of all the products in the U and Ra series, referring in all cases to the quantity of substance in equil. with 1 g. of Ra). C. H. V.

Nature of Gamma Rays. TH. LABY AND P. W. BURBIDGE. Univ. Cambridge. *Radium*, 8, 464-5.—It has been pointed out by von Schweidler that such effects as ionization by α particles should be susceptible of variations. Attempts have been made to show whether such discontinuous effects are produced by γ rays. Two cylindrical ionization chambers were placed side by side, their axes directed towards a source of γ rays (Ra). If the rays have a spherical wave front the 2 recipients should be equally affected by the rays, and when one is charged positively, the other negatively, and both connected to an electrometer, the 2 currents should counterbalance each other. If the rays are a type of corpuscular radiation, and consist of a finite number of particles, an unequal effect should be produced in the ionization chambers over short intervals of time which should be shown by the electrometer needle. This was obtained. Therefore either the γ rays of Ra are constituted by projected particles, or the number of ions produced in air by a const. source of rays is susceptible to variations. A. T. CAMERON.

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The Half Time of Polonium. E. REGENER. Univ. Berlin. *Radium*, 8, 458–61. —R. has previously found the value 129.5 days, using the scintillation method (cf. *C. A.*, 4, 989). Values by other observers varied from 134.5 to 143 days. A perfect satn. current is obtained with α particles only with difficulty, and results depending on ionization by α particles, as in the case of polonium, are affected. Measurements have been carried out to det. in what sense this cause of error affects the result, and it is found that the incomplete satn. gives too great a period. A strongly active polonium prep. containing no Ra D or E was used. Satn. curves were detd. at 4 periods between Feb. 24, 1910, and Jan. 7, 1911, for 1200, 2400, and 3600 volts in each case. Calculating from each 2 consecutive and corresponding values, figures for the period are obtained between 145.6 and 136.2, and the curves show that the latter is very nearly the value for perfect satn. R. concludes that this number, 136 days, is correct to within 0.5 day, the corresponding figure for λ being 0.005096 (day). A. T. CAMERON.

Röntgen Ray Research. The Use of Tungsten for the Target. W. D. COOLIDGE. *Met. Chem. Eng.*, 10, 146. E. J. C.

Ions and Neutral Particles in Recently Prepared Gases. L. BLOCK. *Radium*, 7, 354–62. J. J. M.

Modern Uses and Applications of Radium. H. LIEBER. *J. Frank. Inst.*, 172, 579–90. J. J. M.

Photoelectric Action and Beta Rays. G. CASTANZO. *Radium*, 7, 92–3. J. J. M.

The Magnetic Field of Cathode Rays. A. JOFFÉ. *J. Russ. Phys. Chem. Soc.* (*Phys. Pt.*), 43, 7–14; through *Chem. Zentr.*, 1911, I, 956.—The magnetic effects of the cathode rays which Herz, von Geitler and Klupathy vainly sought, were decisively established by J. Cathode rays from a Wehnelt tube passed into a long tube where they caused the deflection of an astatic magnetic system. A part of the rays fell upon an electrode at the end of the tube, and passed to the anode through a galvanometer. Another portion of the rays passed back on the silvered inner surface of the tube. The observed deflections of the magnetic system were found proportional to the throws of the galvanometer and checked, with the action of the equiv. elec. current within 5%. C. H. V.

Remarks on the Communication of E. Gehrcke and O. Reichenheim "The Döppler Spectrum of Hydrogen Canal Rays." H. v. DECHEND AND W. HAMMER. *Ber. physik. Ges.*, 13, 203–5.—The author's expts. on the displacement of the canal rays in H seem to confirm Gehrcke and Reichenheim's assumption (*C. A.*, 4, 2409) that the kinetic energy of the H and H_2 particles is not equal. C. H. V.

Influence of the Form of Condenser on the Shape of the Curve of Saturation Obtained with the Alpha Rays. E. REGENER. Univ. Berlin. *Radium*, 8, 461–4; *Ber. physik. Ges.*, 1911, 1065–73.—Owing to the difficulty of obtaining a satn. current with α-rays, various forms of condenser have been tested using an active polonium prep. as source of the rays. These all gave rise to differently shaped satn. curves; the best results were obtained with plane condensers consisting of parallel plates, the next best with hemispherical condensers. Considerably better results are obtained by decreasing the distance between the 2 planes (from 5 to 0.5 cm.). A. T. CAMERON.

A New Radium Perpetuum Mobil. H. GREINACHER. *Verh. phys. Ges.*, 13, 398–404.—A small brass plate is imbedded in paraffin at 1 end of a brass tube 1 m. long, the other end of which is connected to the top of an electrometer. A very fine Cu wire from the brass plate down through the paraffin is connected with the needle of the electrometer. A 0.5 mm. thickness of paraffin over the brass plate is covered with a 0.015 mm. thickness of Al foil. When a Ra prep. is laid on the Al foil the β-

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rays penetrate and charge the brass plate, the paraffin conserving the charge. This charges the needle, which swings around between the halves of the electrometer until a Pt contact on the needle engages a Pt wire set vertically between the upper and lower plates. This discharges the needle, which returns to its initial position and again becomes charged. By having the Ra a m. above the electrometer, which has a thick brass case, the ionization inside the electrometer is reduced to such an extent that the needle may charge up to the extent of 10 v. The author's instruments charged up in from 5 to 9 min. when 3 mg. $RaBr_2$ were used. Its advantages over the Ra clock of Strutt are: (1) that it works in the air, (2) it is easily set up, (3) small quantities of Ra (1 mg.) are effective, and (4) the Ra prep. may be removed for other use.

C. H. VIOL.

4. ELECTROCHEMISTRY.

C. G. FINK.

A Method of Studying Power Costs. G. I. RHODES. *Proc. Am. Inst. Elec. Eng.*, 31, 129–48. C. G. F.

New Hydroelectric Plant of Northern California Power Co. RUDOLPH W. VAN NORDEN. *Elec. World*, 5, 237. C. H. ELDRIDGE.

Hydroelectric Plant of North Carolina Electrical Power Co. N. BUCKNER. *Elec. World*, 59, 353. W. E. RUDER.

Progress in the Electrometallurgy of Iron and Steel. D. F. CAMPBELL. *Elec. Rev. West. Elec.*, 59, 980; *Electrician*, 68, 149; see *C. A.*, 6, 28. C. G. F.

Installations of Girod Furnaces. ANON. *Eng. Min. J.*, 93, 420.—A list of towns where these furnaces are now in operation. C. G. F.

Electric Smelting of Zinc-Lead Ores at Sarpsborg, Norway, and at Trollhattan, Sweden. J. C. MOULDEN AND F. W. HARBORD. *Chem. Eng.*, 14, 510.—Ores to be treated are complex sulfides, Broken Hill slime, and mixed sulfides of Pb, Zn, Cu, and Fe, hitherto of but little com. value. The furnace has C electrodes, one in bed and the other removable through the roof, and the smelting is effected by resistance with low voltage current. Capacity of furnace is 3 tons, rate 2.8 tons of roasted ore per 23 hr. at a h. p. of 350. Charge consists of roasted ore, coke or anthracite dust and flux, yielding crude spelter, Zn-Pb powder to be recharged, Ag-bearing Pb, Cu-Fe mat containing Zn and Ag, and slag, containing a little Pb. H. ran tests over a 27½-day period at Trollhattan, smelted 518 tons of roasted Broken Hill slime, 19 tons of calomine, 22½ tons of Zn-Pb powder, and produced 161 tons of crude Zn, 2.5 tons of Pb, 36 tons of powder, together with 17 tons of "leak" Pb (the furnace being of porous material), and 9 tons of Zn-Ag-Pb skimmings or 64% Zn, 74% Pb, 46% Ag, not considering the powder. M. believes that yield can be made to reach 75% Zn, 80% Pb, and 80% Ag, and on above basis he figures a profit of 1.9 s. per ton of slime, with slime at 2.16 s. 8 d. per ton at Broken Hill, freight 2.5 s. 3 d., cost of treatment 30 s. 7 d. and elec. heat at Trollhattan costing 30 s. 3 d. per h. p. yr., and calc. cost at Tyse of 14 s. per h. p. yr. C. H. ELDRIDGE.

Nitrogen Fixation in Norway. L. L. SUMMERS AND E. R. WOLCOTT. *Elec. World*, 59, 396.—The Notodden plant has a head of 1700 ft. with 70 ft. drawdown, and discharges its tail-water into a stream 500 ft. below the generator floor. The power factor of the Birkeland and Eyde furnaces is 70%. The efficiency of the furnaces is about 1200 lb. HNO_3 per kw. yr. L. K. MULLER.

Electrolysis. A. F. GANZ. *Elec. Rev. West. Elec.*, 60, 383.—A review of elec-

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trolysis due to stray currents in the ground. Various methods and means used to prevent the destruction of underground piping and cable sheaths are discussed.

C. G. F.

Electrolytic Production of Persulfates. A. BLUMER. Leipzig. *Z. Elektrochem.*, 17, 965.—An anode of Pt wire wound around glass rods to form a cylinder, is used in a water-cooled cell. Without the use of a diaphragm a yield of 80% was obtained in strongly acidified soln. with 4–5 amps. per sq. cm. By using a diaphragm an almost theoretical yield may be obtained even with moderate acid concs. Ni and Cu cathodes were used. By adding $K_4Fe(CN)_6$ good output of $(NH_4)SO_4$ is also obtained without the use of any other diaphragm (diaphragm is formed in the soln.). Adding $CoSO_4$ or $Al_2(SO_4)_3$ did not work quite so well. W. E. RUDER.

The Electrolytic Reduction of Ketones. J. TAFEL. *Z. Elektrochem.*, 17, 972–6.—With a Cd cathode, in H_2SO_4 soln. and at ordinary temps., $(CH_3)_2CO$ is almost completely reduced to propane. Under similar conditions isopropyl alc. is unaffected. With Hg or Pb cathodes, acetone is also partially reduced to propane. Although propylene and hexane were looked for, no gaseous products beside propane were found. $CH_3.C_2H_5.CO$ is reduced in acid soln. to butane. In general, the higher aliphatic ketones require much higher c. ds. for good reduction efficiencies. No actual c. ds. are given. J. S. GOLDBAUM.

Diagram of Equipotential Lines in an Electrolyzer. A. BROCHET. *Compt. rend.*, 153, 1150–2.—Equipotential lines in an electrolyzer were plotted by the use of a rectangular cell, the 2 ends of which are the electrodes. A test electrode of Cu wire, connected to a quadrant electrometer, was used to obtain the zero readings. An electrometer was also connected between the test wire and the electrode. The wire is then moved in the soln. until the electrometer reads zero and the potentiometer reading is taken. In thin layers this may be plotted on ordinary coördinate paper. The current lines are always perpendicular to the lines of equal potential. W. E. RUDER.

Luminous Intensity and Energy Relations in Incandescent Lamps. F. E. CADY. *Elec. Rev. West. Elec.*, 59, 1087–92.—In the formula $I = aV^k$, where I is the c. p. and V the voltage, k is a variable and a function of the efficiency. In the case of metal filament lamps at a given sp. consumption, k is the same to within small differences for all lamps of the same filament material, but different for lamps of different material. The above is also true for untreated C lamps but for treated or flashed C lamps k varies with the treatment. In this case, however, the exponent k', for the relation between c. p. and wattage is const. for lamps of varying size and manuf. when operating at the same efficiency. As in the case of k, k' decreases with increase in efficiency. The following general equations for the c. p. voltage and the c. p. wattage relations are given:

$$\frac{I}{I_0} = \left(\frac{V}{V_0}\right)^k \left[1 + B\frac{V - V_0}{V_0} + C\left(\frac{V - V_0}{V_0}\right)^2\right] \text{ and}$$

$$I = I_0 e^{B[1 - (W_0/W)^c]}$$

where I_0, V_0 and W_0 are values corresponding to normal voltage, e the base of the Napierian logarithms, and B and C consts. which are general for Ta and W lamps. The values of B and C are given as 0.24 and —0.65 for Ta and 0.02 and —0.5 for W lamps. C. N. MOORE.

Cold Light Emitted from a Point. DUSSAUD. *Lumière Elec.*, 17, 163–75; cf. *C. A.*, 6, 32.—The new lamp is of the W incandescent type with the filament wound in the form of a solenoid 2 mm. in diameter and over 4 mm. in length, occupying a space of about 10 cu. mm. The diameter of the filament, size of the bulb, and other details of manuf. are not given. A very detailed account of the various applications

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(medical, botanical, photographical, ultramicroscopical, cinametographical, etc.) is given. Either a. c. or d. c. and preferably discontinuous may be used. The frequency of the current interruptions is so chosen as to allow the solenoid to attain the "dark state" at each interruption. D. claims a light economy of 200 times that of the C arc. No accurate photometric data were obtainable. C. G. F.

Short Electric Waves and Long Heat Waves. DAVID OWEN. *Electrician*, **68**, 504–7; cf. *C. A.*, **5**, 2364.—A review of the work of Rubens, Lebedev, Lampa, and Bose. R. W. MOORE.

A Determination of the International Ampere in Absolute Measure. E. B. ROSA, N. E. DORSEY AND J. M. MILLER. *J. Wash. Acad. Sci.*, **1**, 211.—The authors have detd. very accurately the international ampere, using the Rayleigh type of current balance. The result expressed as the e. m. f. of the Weston normal cell at 20° in terms of the international ohm and the abs. ampere is 1.01822 with a possible error of 2 in 100,000. J. L. CRENSHAW.

Paint and Rusting (LIEBREICH, SPITZER). 26. Refining Silver and Gold Alloys (KERN). 9.

Ger., 231,508, May 25, 1910. SOC. FRANCAISE D'INCANDESCENCE PAR LE GAZ (SYSTÈME AUER). **Supporting frames for filaments.** From a center rod or tube of quartz or SiO_2 a series of fine bearing arms are drawn after heating the place concerned and filaments supported by them.

Ger., 231,733, June 27, 1908. O. KJELLBERG. **Electrode and electric soldering.** The solder is provided with a coating of fireproof material, a 2nd class conductor, the crater-like projecting portion of which prevents fouling by the molten metal of the electrode, whereby the soldering of the under side of bodies is possible. The coating may contain substances influencing the chem. and mechanical properties of the surface to be soldered.

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5. PHOTOGRAPHY.

LOUIS DERR.

Photographic, Photometric Measurements of Absorption by Silver Iodide in the Ultraviolet Spectrum. CURT SCHELL. Univ. Leipzig. *Ann. Physik*, **35**, 695–726.—A combination of the methods of equal times of exposure of the photographic plate and of different times of exposure for the same degree of darkening was employed for the different radiant intensities. After developing, fixing, and drying the plates were examd. by the photometer. Irregularities in the developed plates caused by conc. differences in the developer were obviated by first soaking the plates in H_2O and using a slow developer; the best results were obtained with Fe oxalate. The characteristic plate constant δ is constant throughout the spectrum; this constant is independent of the degree of darkening of the plate, the possible difference being less than 1%. A Nernst lamp and a spark discharge in N between Cu electrodes were used as sources of radiation. The absorption coeff. of AgI was measured for the spectral region 215–450$\mu\mu$; maxima of absorption were found for the wave lengths 422.6, 322.2, and 271.2$\mu\mu$. Ag mirrors prepared by chem. means showed, after iodizing, no difference in power of absorption from mirrors deposited on a cathode. H. S. PAINE.

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6. INORGANIC CHEMISTRY.

H. I. SCHLESINGER.

The So-called Sulfammonium and the Spectroscopic Test for New Compounds. OTTO RUFF. *Verh. Ges. Naturforsch. Aerzte.*, 11, 24–5 (1911); through *J. Chem. Soc.*, 100, II, 484; cf. *C. A.*, 5, 1883.—R.'s opinion that the reaction in liquid NH_3 between N_4S_4 and H_2S ($N_4S_4 + 6H_2S \rightleftarrows 10S + 4NH_3$) is a balanced one is now supported by measurements of the absorption of light of solns. of the same total conc., which were made up either from liquid NH_3, N_4S_4 and H_2S, or from liquid NH_3, H_2S and S. The same absorption curves were obtained in the 2 cases. E. J. C.

The Weight of a Normal Liter of Hydrogen Chloride and the Atomic Weight of Chlorine. F. P. BURT AND R. W. WHYTLAW GRAY. *Trans. Faraday Soc.*, 7, 30–41; see *C. A.*, 5, 2227. C. G. F.

Dissociation of $ThCl_4.18NH_3$. E. CHAUVENET. *Ann. chim. phys.*, 23, 275–80.—$ThCl_4.18NH_3$ dissociates at low temp., the vapor pressure being at —22.5°, 246 mm., at —10°, 560 mm., at 0°, 1031 mm., at +80, 1630 mm. The following values were detd. or calc.: Mol. sp. heat of $ThCl_4$, 149.8; of $ThCl_4.18NH_3$, 356.8. Heat of soln., of $ThCl_4.18NH_3$ in HCl, 214.2 cal. Heat of formation of $ThCl_4.18NH_3$, 225 cal. That of $ThCl_4.12NH_3$ being known, that of the addition of $6NH_3$ to $ThCl_4.12NH_3$ is found to be 53 cal. From these results the correctness of $Q/T = 0.032$ could be established. Also that of Clapeyron's formula. H. GRUENER.

Thiophosphates and Thiophosphites. F. EPHRAIM AND R. STEIN. Univ. Bern. *Ber.*, 44, 3405–16.—The tendency of the compds. of this general nature to dissociate is offset by the presence of an excess of 1 of the constituents, namely, the metallic sulfide. *$K_3PS_4.H_2O$:* 100 g. $K_2S.5H_2O$, not completely freed from the mother liquor, are well mixed with 7.5 g. P_2S_5, and the mixt. carefully heated. The substances unite and 30 cc. water are added. The mixt. is filtered and cooled. Crystals sep. in form of quadratic rods. Yield, only 0.4 g. The salt is sol. in H_2O and stable. *Formula of compound $(NH_4)_3PS_4$:* Conc. $(NH_4)_2S$ soln. is treated with $^1/_3$ the theoretical amt. of P_2S_5. Gentle warming causes soln. Filtering and cooling yields crystals with larger yield than for K salt—$Ba_3(PS_4)_2$.aq. was obtained by double decomp. of Na salt with BaS.—$Sr_3H_6(PS_3O)_4$.aq. was formed from Na salt and SrS. The conc. is influential in detg. the proportion of S and O, and a compd. with $S_{3.5}O_{0.5}$ was easily obtained. Ca and Al compds. could not be formed. *Thiophosphites, from P_4S_7:* Combination of Na_2S and P_4S_7 was accompanied by evolution of a combustible gas (P and H compd.). This is avoided if Na_2S is free from mother liquor and well pulverized. One-eighth of the theoretical wt. is added in small portions and with stirring. From the filtered liquid the salt crystallizes well with abundant yield. The salt is sol. in H_2O, probably with decomp., and has structure, *$Na_3PS_3.23H_2O$. From P_4S_3:* 8 g. P_4S_3 are mixed with 100 g. Na_2S. The operation is finished at 30° and with addition of 20 cc. H_2O. Some H escapes. After filtering hot, a ppt. forms in the course of some hours. Yield, small. The salt is stable in the air. Analysis showed *Na_3PS_3*. The compd. was obtained with 2½ or 7 mols. of H_2O of crystn., according to the conditions. *Compound*, $Ba_3(PS_3)_2$.aq. was formed from BaS in excess and P_4S_7, the product being pptd. with alc. From BaS soln. and P_4S_3 a *salt* of somewhat different comp. was formed, namely $Ba_3(P_2S_6O).8H_2O$. H. GRUENER.

Iodine Oxides, I_6O_{13} and $I_{10}O_{19}$ and Iodine Nitrate. H. KAPPELER. Basel. *Ber.*, 44, 3496–501.—These oxides are repeatedly mentioned as existing, but are here shown to be simply I_2O_4, that is, basic iodine iodate, $IO.IO_3$. The compds. were prepared according to the original directions and analyzed with reference to the propor-

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tions of basic and acid I which they contained. *IO.NO$_3$:* Finely pulverized I was treated with 10–20 times the amt. of HNO_3 (1.52). Presently a voluminous yellow ppt. was formed. This is filtered on a Gooch filter, dried on absorbent plates, and at once analyzed. NO_3 could not be detd., but from the proportions of basic and acid I present K. decides that the compd. is either a basic or normal nitrate of I, $IO(NO_3)$ or $I(NO_3)_3$. H. GRUENER.

The Solubility of Cuprous Oxide in Aqueous Ammonia Solutions and the Composition of the Cuprous-ammonia Complex. F. G. DONNAN AND J. S. THOMAS. *J. Chem. Soc.*, 99, 1788–96; *Proc.*, 27, 213.—The solubility of Cu_2O in NH_3 solns. was detd. at 25° in an atm. of H_2. As the conc. of the NH_3 changed from 0.23 to 7.2 mols. per 1000 g. of soln., the solubility of Cu_2O changed from 0.00566 to 0.0267 mols. per 1000 g. soln. For a certain range of NH_3 concs. the conc. of total Cu is approx. proportional to the sq. root of the "free" NH_3. From this the conclusion is drawn that in these solns. the cuprous-ammonia hydroxide exists mainly as $(Cu.NH_3)OH$. D. M. LICHTY.

Decomposition of Dry Ozone. D. L. CHAPMAN AND H. E. JONES. *J. Chem. Soc.*, 99, 1811–19; *Proc.*, 27, 224.—Contrary to the conclusion of Shenstone (*J. Chem. Soc.*, 71, 471), that O_3, dried over P_2O_5, is much less stable than the moist gas, the authors find that O_3 so dried and that dried over conc. H_2SO_4 decompose at the same rate under the same conditions. From these results and those reported in *C. A.*, 5, 1238, they infer that O_3 can revert to O_2 without the intervention of any other substance. D. M. LICHTY.

The Hydrolysis of Sodium Oxalate. WILLIAM BLUM. Bur. of Standards, Washington. *J. Am. Chem. Soc.*, 34, 123–36.—The soln. of pure $Na_2C_2O_4$ is alk. 0.1 molar $Na_2C_2O_4$ soln. produces a color with phenolph. equiv. to 4% transformation of the indicator; 0.2 molar soln. equiv. to 6% transformation, corresponding, most probably, to $[H]_{18°} = 2.5 \times 10^{-9}$ and 2.0×10^{-9}. The use of calc. standards for detg. the normal alkalinity of $Na_2C_2O_4$ is inaccurate. The value of the ionization const. for phenolph. is probably less than 1.7×10^{-10} for solns. in which it is less than 8% transformed. $Na_2C_2O_4$ soln. does not decompose appreciably on b.; it readily attacks glass ("Durax" glass least of the kinds tested). Com. samples of $Na_2C_2O_4$, dried at 240°, may contain $NaHCO_3$ or even occluded CO_2. A new method of testing the neutrality of $Na_2C_2O_4$ is recommended to replace that of Sörensen. A. R. MIDDLETON.

The Atomic Weight of Mercury. III. Analysis of Mercuric Bromide. C. W. EASLEY AND B. F. BRANN. Univ. of Maine. *J. Am. Chem. Soc.*, 34, 137–47; cf. *C. A.*, 4, 153; 5, 1715.—From the ratio $HgBr_2 : 2AgBr$, mean of 11 expts., the at. wt. of Hg = 200.64. A. R. MIDDLETON.

Catalytic Decomposition of Hydrogen Peroxide in a Homogeneous Medium. E. SHPITALSKII. *J. Russ. Phys. Chem. Soc.*, 42, 1085–1159; cf. *C. A.*, 5, 838, 1566. J. J. M.

Formation of Iron Carbonyl. A. STOFFEL. *Chem. Weekblad*, 8, 722–34; *J. Chem. Soc.*, 100, II, 986.—An investigation of the conditions governing the formation of Fe pentacarbonyl. Up to 60° the influence of temp. on the reaction is slight, but just below 80° adsorption of the reaction product by the Fe at first retards the formation of the carbonyl, and finally inhibits it. Above 80° dissociation stops the action, so that large quantities in the state of vapor cannot be formed. The presence of NH_3 accelerates the combination of CO and Fe; that of H_2S exerts no influence. J. J. M.

Partition of Soda between Boric and Carbonic Acids. Preliminary Note. F. AGENO. Ist. chim. gen. univ., Pisa. *Atti accad. Lincei*, 21, I, 121–3.—The amt. of

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CO_2 dissolved at 25° by a known vol. of a soln. of H_3BO_3 and borax of known conc. was detd. The conc. of free H_3BO_3 was kept const. by keeping the soln. satd. The conc. of free H_2CO_3 was assumed equal to the amt. dissolved by an equal vol. of dist. H_2O at the same temp. and pressure, and the difference between this and the total H_2CO_3 was regarded as that which had entered into combination to form bicarbonate. Hence $K = 0.90x/(a-x)(c-x)$, where a is the total soda, x that required for the combined carbonic acid, c the total conc. of the latter, 0.90 the conc. of the free H_3BO_3 in satd. soln. The experimental values of K fall enormously below the theoretical and decrease as the soda increases. This may be due to changes in solubility of the CO_2 owing to the presence of borate and bicarbonate, or to the increase of polyborates with increasing total conc. of soda. A satd. soln. of borax (0.34 *N*) without solid borax was satd. with CO_2 at 25° and 763 mm.; $(HCO'_3)/(BO'_2) = 2.27$. With the same soln. but with solid borax present, $(HCO'_3)/(BO'_2) = 1.7$; *i. e.*, in the 1st 67.7%, in the 2nd only 63.5% of the soda is transformed into bicarbonate.

CHAS. A. ROUILLER.

Action of Nitrogen and Oxygen on Magnesium. C. MATIGNON AND LASSIEUR. *Compt. rend.*, 154, 63–5; *Bull. soc. chim.*, 11, 262–4.—Pure N begins to act on Mg at 670°, while in pure O the reaction starts at 600°. In air at temps. between 600° and 670° the Mg should absorb only the O. This result was actually obtained at 620°. By heating Mg in a closed crucible to a temp. at which the Mg begins to vaporize the nitride was obtained in cryst. form. Mg amalgam was found to behave toward N and O in a manner similar to that of pure Mg. EDW. WOLESENSKY.

Production of Persulfates (BLUMER). 4. Action of Carbon Dioxide on Bordeaux Mixtures (GIMINGHAM). 15. Bisilicates and Titanates (SMOLENSKII). 2.

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7. ANALYTICAL CHEMISTRY.

E. G. R. ARDAGH.

Methods of Analysis of the Higher Oxides of Lead and Chemical Reactions of Lead Salts. A. CHWALA AND E. COLLE. Milano. *Gazz. chim. ital.*, 41, II, 551–79; see *C. A.*, 5, 2609. CHAS. A. ROUILLER.

Titration of Phosphoric Acid. M. WAGENAAR. *Pharm. Weekblad*, 48, 845–50; through *J. Chem. Soc.*, 100, II, 931.—W. recommends the following procedure for detg. the 3 H ions of H_3PO_4: For the 1st ion the soln. is tinted red with Me orange, and titrated with alkali until yellow; for the 2nd, the titration is repeated after addition of phenolph., for the 3rd, excess of $Pb(NO_3)_2$ is added, and the rose-red soln. titrated with NaOH. $3Pb(NO_3)_2 + 2Na_2HPO_4 \rightleftarrows 4NaNO_3 + Pb_3(PO_4)_2 + 2HNO_3$.

E. J. C.

Sulfur Determination in Pig Iron and Steel. H. KINDER. Duisberg-Meiderich. *Stahl u. Eisen*, 31, 1838–9.—The method depends on the reactions: $10KI + 2KMnO_4 + 8H_2SO_4 \longrightarrow 10I + 6K_2SO_4 + 2MnSO_4 + 8H_2O$ and $H_2S + 2I \longrightarrow 2HI + S$. The $KMnO_4$ is added in excess, thus liberating excess of I, which is titrated back with $Na_2S_2O_3$. The $KMnO_4$ is standardized against $Na_2S_2O_3$ as follows: 10 cc. of KI soln. (30 g. KI + 10 g. $NaHCO_3$ in 1 l. H_2O) were acidified with 25 cc. H_2SO_4 (1 : 3) and a measured amt. of $KMnO_4$ (10 cc.) added. The free I was titrated with $Na_2S_2O_3$. The $Na_2S_2O_3$ soln. was dild. till 1 cc. = 1 cc. of $KMnO_4$. This titration of $Na_2S_2O_3$ gave the same result as when $KBrO_3$ or $K_2Cr_2O_7$ in presence of KI were used. The detn. in Fe is carried out thus: 5 g. turnings are dissolved with warming in 100 cc. HCl (d. 1.19) in 1 of the usual S detn. apps. The evolved gases are passed first through

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a flask containing a little water to remove most of the HCl, then into a wash bottle containing 50 cc. of ammoniacal $CdCl_2$ soln. (20 g. $CdCl_2$ + 400 cc. H_2O + 600 cc. NH_4OH (d. 0.96)). The pptd. CdS is filtered off, washed several times and transferred to a 500 cc. flask in which 10 or 20 cc. KI soln. had been previously placed, treated with 25 cc. H_2SO_4 and sufficient $KMnO_4$, then shaken until all of the CdS has been decomposed by the free I, leaving an excess of I. The excess of I is then titrated back with $Na_2S_2O_3$. After subtracting the $Na_2S_2O_3$ the $KMnO_4$ is calc. to S. Some comparative results are given. A sample containing 0.140 and 0.141% S according to gravimetric methods, by the I method, gave 0.137 and 0.138%; by this method gave 0.139, 0.139, 0.137; 0.140%. Another: gravimetrically, 0.123% S; I method 0.122 and 0.123%; this method 0.126, 0.126, 0.129%. E. J. WITZEMANN.

Acids in the Complete Precipitation of Gold. E. PRIWOZNIK. *Oesterr. Z. Berg. Huttenw.*, 59, 639–41.—Describes the best conditions for complete pptn. of Au by means of $FeSO_4$, SO_2, $C_2H_2O_4$ and $C_2H_2O_2$. E. J. ERICSON.

Organic Combustion Analyses without the Use of an Oxygen Carrier. J. MAREK. Agram. *J. prakt. Chem.*, 84, 713–31.—M. finds, by analyzing a large no. of org. compds., that complete combustion can be effected simply in a stream of O if 10 cm. of the tube is maintained at bright red heat. By means of suitable asbestos and Ni shields (cf. *Ibid.*, 73, 363), the Jena combustion tube, 55 cm. long, can be heated by means of single burner to bright redness the requisit 10 cm. without bending and can be used for 100 analyses. Another shield permits of heating the adjoining 14 cm. to incipient redness. The substance is introduced into the tube in boats or little Jena tubes of special form. By means of a wire passing through the rear stopper, the position of these tubes can be adjusted as demanded by the volatility of the substance and the course of the combustion. If the substance contains S, N or halogens, 8–10 cm. of the front end of the tube are filled with granular PbO_2. The absorption app. used is described. C. A. ROUILLER.

Note on the Determination of small Quantities of Methyl Alcohol. C. SIMMONDS. *Analyst.*, 37, 16.—Denigès method (*C. A.*, 4, 1725) for the detection of MeOH is utilized. The sample is purified by the method of Thorpe and Holmes (*J. Chem. Soc.*, 83, 314) or by other suitable means, and is then dild. with water or Et alc. to a total alc. content of 10% by vol. Five cc. of this soln. are treated with 2.5 cc. of $KMnO_4$ soln. (2.0 g. per 100 cc.) and 0.2 cc. conc. H_2SO_4. When the reaction has proceeded 3 min., 0.5 cc. of $H_2C_2O_4$ soln. (9.6 g. per 100 cc.) is added. On shaking, the liquid becomes nearly colorless. One cc. conc. H_2SO_4 is added and well mixed and the mixt. treated with 5 cc. of Schiff's reagent. A violet color, due to the reaction of the fuchsin soln. with HCHO, is developed in a few min. unless mere traces of Me alc. are present, in which case 20–30 min. are required. The H_2SO_4 present is sufficient to prevent reaction by any CH_3CHO which may have been formed. After a preliminary rough detn., a portion of the soln. under exam. is dild. with 10% Et alc. until it contains 0.001–0.004 g. Me alc. in 5 cc. and the detn. is repeated. The colors are compared in 25 cc. Nessler tubes using standards containing 0.001, 0.002, 0.003, etc., g. Me alc. in 5 cc. of 10% Et alc. 0.0003 g. Me alc. may readily be detected but the above limits are best. HCHO must be absent or must be previously detd. and allowed for. Glycerol must also be absent. P. B. DUNBAR.

Buret for Gas Analysis (ALEIXANDRE). 1. Determination of Carbohydrates (GREIFENHAGEN, *et al.*). 11B. Removal of Ammonia (MERLO). 18. Apparatus for Determining Arsenic (IVANOV). 1. Apparatus for Determining Carbon Dioxide (RUPP). 1. Nickel Hydroxide in Tannin Estimation (SINGH). 29. Acidity of Tan Liquors

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(Wood, *et al*). 29. Estimation of Mercury (Puckner, Hilpert). 17. Color Analysis (Dosne). 25.

8. MINERALOGICAL AND GEOLOGICAL CHEMISTRY.

ROGER C. WELLS.

Viktor Uhlig. W. Branca. Berlin. *Z. deut. geol. Ges. Monatsb.*, 1911, 385–96. —Biographical. E. T. Wherry.

Suggestions for Mineral Nomenclature. H. S. Washington. *Am. J. Sci.*, 33, 137–51.—Chem. comp. and cryst. form are the main essentials in defining and detg. the character of any mineral. Isomerism has been a potent factor in mineralogical nomenclature. The present system is criticized. The work of Penfield and others is reviewed. It is suggested that names of minerals be formed similarly to those of oxides and salts, but with cryst. form implied. The names in general will be binomial, one term indicating the basic, the other the acid portion of the mol., the latter being of most importance. Water of crystn. will be considered as belonging to the acid portion. Isomorphous replacement in the acid portion of the mol. are to be indicated by a proper hyphenated prefix. (Ex. Ferri-garnetates). Differences in cryst. symmetry should be expressed by a root derived from the present group name. The base or bases should be indicated by names of the positive elements, often abbreviated. (Ex. Magfer hypersthenate). An appendix of the proposed system, applied to numerous groups, is given. R. J. Wysor.

Zittavite, an Epigenetic Lignitic Mineral Resembling Dopplerite. Fr. Glöckner. Berlin. *Z. deut. geol. Ges. Monatsb.*, 1911, 418–9.—A black pitchy material deposited by humus solns. in cracks in lignite beds had the comp.: C 61.89, H 5.52, O 30.42, N 0.21, ash 1.95%; sp. gr. 1.33. E. T. Wherry.

Analysis of a Glass with Crust Development. A. Rzehak. Brünn. *Centr. Min.*, 1912, 23–6.—The comp. of the "moldavite" from Oberkaunitz (cf. Weinschenk and Steinmetz, *C. A.*, 5, 2383) was found to be matched exactly by that of an early Venetian glass, on which weathering had produced peculiar surface markings. Not a single reason for assuming the meteoric origin of the former thus remains. E. T. Wherry.

Lorandite from the Rambler Mine, Wyoming. A. F. Rogers. *Am. J. Sci.*, 33, 105–6.—A specimen from Southern Wyoming constitutes the 2nd known occurrence of this mineral. A description of its chem. and physical properties with special attention to cryst. form is given. R. J. Wysor.

Hexahydrite: a New Mineral. R. A. A. Johnston. Canada, Dept. Mines, Geol. Survey Branch. *Summary Report for* 1910, No. 1170, 256–7.—The mineral occurs at Lillooet, British Columbia, in seams; it is often columnar (sometimes fibrous) in structure; specimens showed no crystals; cleavage prismatic but ill-defined. Analysis showed: SO_3 35.19%, MgO 17.48%, H_2O 47.33%. This corresponds closely with $MgSO_4$. $6H_2O$ and is the first time that this hydrate has been found in nature. E. J. Witzemann.

Chemical Analysis of Ceylon Thorianite. W. Jakób and St. Tolloczko. Lemberg. *Bull. intern. acad. sci. Cracovie*, 1911, A, 558–63.—A sample of Ceylon thorianite in small, well defined, opaque crystals 2–3 mm. long and d. 8.71, had the following comp.: SiO_2, 0.250; residue after treatment with $HKSO_4$ (chiefly $ZrSiO_4$), 0.150; SnO_2 (?); As_2O_3 (?); Sb_2O_4, HgO, traces; PbO, 2.867; Bi_2O_3, 0.003; CuO, 0.008; CdO (?), trace; Ce_2O_3, 0.107; $(La,Di)_2O_3$, 0.178; Y_2O_3, 0.030; Al_2O_3, 0.260; Fe_2O_3, 3.480; TiO_2, 1.295; ZrO_2, 0.920; CaO, 0.170; Rh, 0.008; ThO_2, 65.370; U_3O_8, 23.470; P_2O_5,

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trace; H_2O, 0.605; CO_2, 0.275; He, 0.225; total, 99.67%. A comparative table of analyses by other workers is given. CHAS. A. ROUILLER.

The Chemical Composition of the Bauxites of Comitat Bihar. B. VON HORVATH. *Földtani Közlöny*, 41, 341–3; through *Chem. Zentr.*, 1911, II, 228.—Bauxites containing over 3% SiO_2 are of doubtful value for the manuf. of Al on account of the formation of an insol. compd. (apparently $NaAlSiO_4$) by the SiO_2 and the Al_2O_3. H. shows that the bauxites of the Bihar mountains are very low in SiO_2 and not only sufficient to supply the demand of Hungary for a decade, but a considerable quantity could be exported. F. W. SMITHER.

Allophanoids. S. J. THUGUTT. Warsaw. *Centr. Min.*, 1912, 35–41.—Enlarging upon his former publication, T. completely refutes the views of Stremme (*C. A.*, 5, 1575 and elsewhere) that the various clay minerals are mixts. or absorption compds. of gels, in that, whenever account is taken of mechanical admixts. of the different minerals, they are found to have characteristic properties in the following respects: Definit chem. comp., as illustrated by several analyses of fractions sepd. by heavy solns. from a pseudomorph of augite from Bilin; hardness, being more variable than the artificial gels; sp. gr.; crystallinity in polarized light; plasticity; and behavior with $Co(NO_3)_2$. While some such gels may exist in nature, cimolite, $Al_2O_3 6SiO_2 . xH_2O$, termierite, with a similar comp., $x = 12$, and anauxite, which is apparently identical with nacrite, $H_4Al_2Si_5O_{14} . 2H_2O$, are certainly not to be classed among them. E. T. WHERRY.

The Characterization of Bauxite. E. DITTLER AND C. DOELTER. Univ. Vienna. *Centr. Min.*, 1912, 19–22.—The term bauxite, originally applied to colloidal $Al_2O(OH)_4$, has come to be used for indefinit mixts. of hydrargillite, diaspore, limonite, etc. Staining with certain dyes may be used to distinguish the true nature of specimens, for although pure Al gels will not be colored, the presence of small amts. of colloidal impurities render them active, SiO_2 in particular attracting basic dyes. Exam. of a number of European "bauxites" showed them to be in general intricate mixts. E. T. WHERRY.

A New Occurrence of Pickeringite in Thuringia. H. HESS VON WICHDORF. Berlin. *Centr. Min.*, 1912, 42–3.—White cryst. masses found in decomp. pyritiferous schist at Wetzelstein had the comp. MgO 5.04, Al_2O_3 11.22, Fe_2O_3 1.66, SO_3 37.31, H_2O 44.88, sum 100.11. This agrees closely with previously described examples of the mineral, yielding the formula $MgSO_4 . Al_2(SO_4)_3 . 22H_2O$. E. T. WHERRY.

Uncommon Silicates in the Veta Madre, Guanajuato, Mexico. E. WITTICH. Mexico. *Z. deut. geol. Ges. Monatsber.*, 1911, 420–5.—Valencianite, a variety of orthoclase, beryl, and datolite occur in veins with quartz, calcite, etc. They have probably developed at fairly low temps., the B acting as a mineralizer. E. T. WHERRY.

The Occurrence of Raspite in North America. E. WITTICH. Mexico. *Z. deut. geol. Ges. Monatsber.*, 1911, 425–7.—In a Sn mine near Guanajuato cleavage flakes were found, apparently representing the rare monoclinic form of $PbMoO_4$, raspite. E. T. WHERRY.

The Relation of Orthoclase to Andesine and Celsian and their Stability in Artificial Melts. E. DITTLER. Wien. *Min. petrog. Mitt.*, 30, 118–27.—Andesine feldspar shows zonal structure even when formed without admixt. of orthoclase. When andesine is crystallized from a melt with some orthoclase the core is poorer in anorthite than the melt and the border is still poorer. Celsian shows much less tendency to crystallize than does anorthite. Admixts. to orthoclase of Li, Rb, and Cs compds. corresponding to orthoclase increase the tendency to crystallize; this is especially true of Cs orthoclase. E. S. LARSEN.

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Crystallized Variscite from Utah. W. T. SCHALLER. *Proc. U. S. Natl. Museum*, 41, 413–30; *J. Wash. Acad. Sci.*, 3, 150–1.—The variscite occurs at Lucin, Utah, as nodules or veins in chert. Its optic properties are: X = a, Y = b, Z = c, α = 1.546, β = 1.556, γ = 1.578; opt. + : pleoc. faint. X = colorless, Y and Z = pale green. On heating at a temp. below 160° the mineral loses water and suffers a remarkable change in optic properties. α = 1.447, β = 1.448, γ = 1.450. The pleochroism becomes marked and *a* axis = lavender, *b* axis = pinkish lavender, *c* axis = violet. The optic orientation also changes. By heating these lavender crystals over a steam bath for several days they take up 2.05% H_2O and become a dirty gray. On heating at higher temps. in a glass bomb they take up less H_2O. The axial ratios of variscite are $a : b : c$ = 0.9852 : 1 : 1.0957. The chem. analyses of the crystals gave: H_2O 22.68, P_2O_5 44.73, V_2O_3 0.32, Cr_2O_3 0.18, Fe_2O_3 0.06, Al_2O_3 32.40, Ni, Co, Cu, Mu, As, Ca, Mg, none; total 100.37. The formula is $Al_2O_3.P_2O_5.4H_2O$. Cf. Pepperberg, *C. A.*, 5, 3553. E. S. LARSEN.

A Contribution to the Petrography of the District of the Upper Rio Magdalena. I. Eruptive Rocks of the Central Cordillera. E. LEHMANN. Danzig-Langfuhr. *Min. petrog. Mitt.*, 30, 233–80.—The igneous rocks described are younger than the upper Cretaceous and older than the Hondra beds of the Tertiary. They comprize quartz monzonite, aplite and flows and tuffs of latite, all of which were derived from the same magma. An analysis of quartz monzonite from Media Luna, S. S.W. Coyaima by A. Lindner gave: SiO_2, 56.32; TiO_2, 0.72; Al_2O_3, 17.30; Fe_2O_3, 3.88; FeO, 4.32; FeS, 0.05; MnO, 0.13; MgO, 2.61; CaO, 4.78; Na_2O, 2.91; K_2O, 4.37; H_2O, 1.49; P_2O_5, 0.47; total 99.35. Sp. gr. 2.740. An analysis of a quartz syenite aplite from western Coyaima gave: SiO_2, 66.041; TiO_2, 1.082; Al_2O_3, 16.126; Fe_2O_3, 2.814; FeO, 0.992; FeS, 0.066; MnO, trace; MgO, 0.484; CaO, 0.605; Na_2O, 3.893; K_2O, 6.738; H_2O, 0.916; P_2O_5, 0.259; total, 100.016. Sp. gr. 2.634. An analysis of the latite from S.E. des Cerro Crude, S. S.W. Coyaima gave: SiO_2, 57.92; TiO_2, 0.67; Al_2O_3, 16.04; Fe_2O_3, 5.81; FeO, 3.13; MgO, 2.19; CaO, 4.42; Na_2O, 3.28; K_2O, 4.15; H_2O, 2.08; P_2O_5, 0.39; BaO, trace; total, 100.08. Sp. gr. 2.740. E. S. LARSEN.

Epidote and Albite from Zöptan. FRANZ KRETSCHMER. Sternberg. *Min. petrog. Mitt.*, 30, 104–17.—From a study of the epidote-prehnite veins of Zöptan K. shows that the order of deposition was the order of increasing basicity—from metasilicate, actinolite, to orthosilicate, prehnite, and finally to basic silicate, epidote. In the albite-epidote veins the order of deposition was actinolite and tremolite, adularia, albite, and finally the basic epidote. The minerals are thought to deposit in the inverse order of their solubilities in a way analogous to the salt deposits studied by van't Hoff. E. S. LARSEN.

Replacement Ore-bodies and the Criteria for their Recognition. J. D. IRVING. Yale Univ. *Econ. Geol.*, 6, 527–60, 619–69.—After a short history of the development of the idea of replacement, as a method of ore formation, the characteristic features of replacement deposits are described and the criteria noted by which they may be recognized as such. The latter are chiefly physical, such as form, vol. change, crustification, etc. Differences in the attack of various minerals by solns. are noted. Fairly pure limestones are more attacked than other kinds of rock. As Al_2O_3 and SiO_2 increase they tend to persist unchanged or slightly altered in the replacing ore. Sandstones and quartzites are far less extensively altered, though perhaps as frequently altered as limestone. Deposits in them are more usually disseminated. In calcareous sandstones the calcite is replaced and the SiO_2 unaltered. The clay shales and their metamorphic derivs. high in Al_2O_3 are the least easily attacked rocks. In igneous rocks, made up of many minerals selective effects are marked.

R. C. WELLS.

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Copper, Silver, Lead, Vanadium and Uranium Ores in Sandstone and Shale. W. LINDGREN. U. S. Geol. Survey. *Econ. Geol.*, 6, 568–81.—Minerals containing these elements occur usually in a disseminated state in sandstones and shales in the Permian, Jurassic and Triassic nearly all the world over. Chalcocite is frequently found in association with carbonaceous matter as well as the V minerals, which suggests a reducing action for their formation. R. C. WELLS.

Certain Natural Associations of Gold. F. C. LINCOLN. *Econ. Geol.*, 6, 247–302.—Data concerning the primary Au and Ag content of igneous rocks warrant no definit averages, although the order of the av. is 62 mg. Au and 3700 mg. Ag per metric ton, about equally distributed between silicious and basic rocks. The presence of Au in volcanic emanations is inferred only from its presence in pneumatolytic deposits. Heated juvenile waters contain it as also most vadose circulating solns. Au veins exist in most strata, but the following aurogenetic epochs are provisionally established: Late Tertiary, Early Tertiary, Late Mesozoic, Permo-Carboniferous, and Pre-Cambrian, the first and last being most important. Au also occurs in salt deposits, in organisms, organic rocks, shales, sandstones and conglomerates, the content increasing in the order named. The net result of erosion is tentatively that 62 mg. of Au in igneous rocks become by erosion 15 mg. in sedimentaries and 28 mg. in the sea water per metric ton. All evidence favors the view that Au lodes are chiefly formed from circulating waters. Regarding its mineral associates, disseminated Au occurs with the common sulfides, As and Sb minerals; visible particles occur with Bi and Te minerals. These associations are given in detail as well as a table showing the action of HNO_3 of various strengths upon the minerals which might be confused with Au under the microscope.
R. C. WELLS.

The Halogen Salts of Silver and Associated Minerals at Tonopah, Nevada. J. A. BURGESS. *Econ. Geol.*, 6, 13–21.—At Tonopah AgCl, cerargyrite, the chlorobromide, embolite, and AgI, iodyrite, occur abundantly in the oxidized portion of the "earlier andesite" in small fissures and seams, along with a variety of products of weathering. The distribution of the haloids with respect to depth shows that from the descending oxidized surface waters AgCl was first pptd., then bromochloride, then iodide, which is contrary to what would be expected from the solubilities. The explanation is that mass effects of concs. detd. the order of deposition rather than solubilities.
R. C. WELLS.

Notes on Tellurium-bearing Gold Ores. W. J. SHARWOOD. *Econ. Geol.*, 6, 22–36; cf. *C. A.*, 5, 1891.—S. emphasizes the frequent association of Te and Au, and of Te and Bi. Se is found with Te at Goldfield, West Australia, at the Waihi mine in New Zealand, and in the Republic district, Washington, where Au is not susceptible to amalgamation or direct cyaniding, and at the Rawhide mine, Cal. R. C. WELLS.

Differentiation Products in the Quartz Diabase Masses of the Silver Fields of Nipissing, Ontario. R. E. HORE. *Econ. Geol.*, 6, 51–9.—From analyses presented H. concludes that certain portions of the diabase containing ores represent end products in a process of differentiation and speaks of such diabase as secondary. R. C. W.

A Theory for the Origin of Graphite as Exemplified in the Graphite Deposit near Dillon, Montana. A. N. WINCHELL. *Econ. Geol.*, 6, 218–30; cf. *C. A.*, 5, 3787.
R. C. WELLS.

The Evergreen Copper Mine, Colorado. E. S. BASTIN AND J. M. HILL. *Econ. Geol.*, 6, 456–72.—Sulfides of Cu, contemporaneous with garnet, augite, wollastonite and quartz are believed to represent an endomorphic effect produced by contact metamorphism at the border of a large intrusion of monzonite. R. C. WELLS.

Hematite Ores of Brazil and a Comparison with Hematite Ores of Lake Superior.

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C. K. LEITH AND E. C. HARDER. *Econ. Geol.*, 6, 670–86.—In the Brazil region "primary sedimentation" was responsible for beds of Fe oxide running up to 2000 ft. in thickness of 65% Fe, in which secondary conc. played little part, just the opposit of the case in the Superior ores. R. C. WELLS.

Some Modes of Deposition of Copper Ores in Basic Rocks. W. LINDGREN. U. S. Geol. Survey. *Econ. Geol.*, 6, 687–700.—Cu minerals in basic rocks are often associated with zeolitic minerals and the agency of sea water is suggested as having caused the formation of the zeolites. In the Bonanza mine, Alaska, a large fissure vein in limestone has been filled with chalcocite, apparently at ordinary temp. There are many districts of fissures, however, where ordinary surface waters have been wholly incompetent to effect mineralization. R. C. WELLS.

Origin of the Rammelsberg Ore Deposit. W. LINDGREN AND J. D. IRVING. *Econ. Geol.*; 6, 303–13.—This deposit of sulfides of Zn, Fe, Pb and Cu in Devonian rocks has been held to be of sedimentary origin, but the authors hold it to be a vein of epigenetic origin in which the structure of the ore has been profoundly altered by dynamo-metamorphism. The vein seems to have flowed like a plastic clay with pyrite showing less plasticity than the other sulfides in accordance with its degree of hardness. R. C. WELLS.

Sandstone-like Tropical Weathering Products of Gneiss and Granit. P. VAGELER. Königsberg. *Centr. Min.*, 1912, 8–9.—A gray to brown sandstone has been observed to form as the first stage of lateritization of igneous rocks. E. T. WHERRY.

Diatoms Fossils. I. Their Beds. II. Applications. A. LAUBY. *Rev. gén. sci.*, 22, 918–27, 949–58.—A discussion of the mode of formation of diatom sediments, their constitution, geographical distribution; also an exam. of the French and German beds. The properties of diatom sediments vary considerably due to the quality and quantity of enclosed foreign material. The relation of their properties to their uses are taken up. The employment as an abrasive, absorbent, guano, filtering material, etc., is fully discussed. 33 analyses are given of French, German, British, Italian, Bohemian, Croatian, Russian, Japanese, Australian and American beds. A. A. KLEIN.

The Origin of the Lead and Zinc Ores of the Upper Mississippi Valley District. G. H. COX. *Econ. Geol.*, 6, 427–48, 582–605; cf. *Ill. Geol. Survey Bull.*, 16, Part 1.—C. follows previous writers in believing that the Pb and Zn existed first as disseminated particles in pre-Cambrian igneous rocks towards the Northeast and were carried to the sea by streams and were deposited with the sediments. At this point he believes that the Maquoketa shale selected the Pb and Zn to a high degreee on account of its organic matter. When this shale was eroded the metals were carried downward by meteoric solns. and deposited in the Galena formation. The shales of highest organic matter have the most metallic sulfides. R. C. WELLS.

The Relation of Texture to the Composition of Coal. F. F. GROUT. *Econ. Geol.*, 6, 449–64.—Analyses of 7 samples selected from a single coal seam on the basis of varying texture show wide differences, bearing witness to the need of careful mine sampling. Mineral charcoal is believed to have originated from forest fires. R. C. WELLS.

The Granits of Connecticut. T. N. DALE AND H. E. GREGORY. U. S. Geol. Survey, *Bull.* 484.—The authors give detailed descriptions of the granit quarries of Conn. and describe the geologic occurrence and petrographic character of the rocks which are quarried. Two analyses of quarried rocks are given. E. S. LARSEN.

The Determination of the Viscosity of Transverse Waves in the Outermost Earth-crust. H. BENNDORF. Graz. *Physik. Z.*, 13, 83–4. L. H. ADAMS.

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The Volcanoes of Central Madagascar. The Itasy Group. A. LACROIX. *Compt. rend.*, 154, 313–7.—The extent, constitution, and structure are described.
J. H. BOWER.

The Salts in the Zechstein of the Lower Rhine Lowlands. W. WUNSTORF AND G. FLIEGEL. *Glückauf*, 48, 89–96.—The geology of the zechstein and a description of the salt beds are given. The comp. of the salts differ in different zones, the minerals found being halite, sylvite, carnallite, and kieserite. Analyses are given and the theory of origin is discussed. A. A. KLEIN.

The Thermal Expansion of Rock at High Temperatures. N. E. WHEELER. *Trans. Roy. Soc. Can.*, [3] 4, (Sect. 3) 19–44.—The expansion of a diabase, a granit, and a marble has been accurately measured at temps. between 0° and 1000°, and compared with that of Ni-steel cylinder between the same limits of temp. There is always, on cooling, a permanent expansion which does not decrease with time.
A. T. CAMERON.

Italian Pozzolana. Investigation of a Sicilian Pozzolana. E. MANZELLA. *Gazz. chim. ital.*, 41, II, 730–47; cf. *C. A.*, 6, 206. CHAS. A. ROUILLER.

Coals of Washington (SMITH). 21. Distribution of Molybdenum Ores (WALKER). 9. Syrian Self-burning Limestone. 20.

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9. METALLURGY AND METALLOGRAPHY.

WILLIAM BRADY, WILLIAM T. HALL.

The Use and Care of Crucibles in Foundry Practice. ANON. *Met. Chem. Eng.*, 10, 182–3. E. J. C.

"Atomized Metals." ANON. *Met. Chem. Eng.*, 10, 180–2. E. J. C.

Briquetting Metal Borings. R. MOLDENKE. *Trans. Am. Foundrymen's Assoc.*, 1911, 489–517 (illus.); through *J. Soc. Chem. Ind.*, 30, 1063.—In the utilization of metallic waste by briquetting under high pressures without the use of a binding material the entangled air, by expanding when the briquets were placed in the furnace caused them to disintegrate, this leading to all the troubles attending the use of loose material. In the process described, the borings, after passing an exhaust fan to remove dust, and an electromagnet separator to remove brass, are fed into the hopper of the press and thence into a die, carried by a revolving table, where they receive their first compression, the air escaping as the borings curl into each other. The die is then carried by the table to the next position, where a pressure of up to 35,000 lb. per sq. in. is applied by plungers above and below, where another plunger forces out the finished briquets on to a band conveyor. While a melt with borings alone gives a loss up to 50% (with pig Fe only a loss of about 3%) the loss with briquets is from 8 to 10% and with briquets made from a mixt. of 80% of borings and 20% of pig Fe there is only a loss of 3–5%. E. J. C.

Drying Blasts with Calcium Chloride. HEYM. *Oesterr. Z. Berg. Hüttenw.*, 59, 603–5.—Drying air by $CaCl_2$ costs only ¼ as much for plant construction as a Gayley refrigeration plant of same capacity. The cost for maintenance is also less. The procedure is as follows: Crushed $CaCl_2$ is sifted to get the fine portion on bottom and the coarse on top. In this layer is inserted a spiral tube for circulation of water. The air to be dried is blown from above through the layers of $CaCl_2$. The heat evolved by absorption of moisture is carried away by the water circulating in the tube, to prevent an increase in temp., since the power of $CaCl_2$ to absorb moisture diminishes at higher temp.

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Precaution must be taken that the $CaCl_2$ does not get wet. To regenerate $CaCl_2$, it must be heated gradually to 175–235° and cooled when it is ready for another cycle. 240 kg. $CaCl_2$ spread 24 cm. deep to a sq. m. are able to dry 300 cu. meter air for 4 hrs., whereby 15 g. moisture per cu. m. were absorbed. Three units are required; while one is used the contents of the second is regenerated and the third one cooled.

E. J. ERICSON.

Direct Smelting of Argentiferous Copper Ore at Rio Blanco, Chile. I. DIAZ OSSA. *Met. Chem. Eng.*, 9, 630–1.—Detailed account of operation of plant. J. S. G.

Flotation Processes in Ore Dressing. MAX MOLDENHAUER. *Metallurgie*, 9, 72–80.—All processes using strong chem. solns., as the Potter-Delprat process, cannot be finished without further wet conc., because otherwise there is a loss of chemicals. Those processes which work at a low temp., such as the Macquisten and Elmore processes, have the great disadvantage of being unable to treat the finest slimes. In all cases the slime should contain no greasy substances or the concentrates will be low-grade. This difficulty could be overcome by preliminary washing but this is liable to entail losses in fine slime. CARLE R. HAYWARD.

Electric Smelting of Copper Ores and of the Intermediary Products of the Copper Blast Furnace. I. SCHILOWSKI. *Metallurgie*, 8, 617–25.—The Cu ore used contained 10% Cu and 9.25% As. This was melted in a lab. arc furnace taking a 4 kg. charge and yielded a 21% mat free from As. Condensation of fumes saved 65% of the As. Part of the ore was roasted until it contained 1.5% S and only traces of As. Expts. with different proportions of roasted and raw ore showed that by using 60–70% roasted ore a 50% mat was produced with a minimum power consumption, low slag loss and with the speise comparatively low in Cu. CARLE R. HAYWARD.

Zinc Smelting in Electric Furnaces. F. W. HARBORD. *Can. Eng.*, 22, 330–1.—Data is given on tests of smelting works under the DeLaval patents at Trollhattan in Sweden, and at Sarpsberg in Norway. LANGDON PEARSE.

Foundry Experience at a Mexican Smelter Plant. B. H. BENNETTS. *Mining Eng. World*, 36, 294.—B. found that trouble, resulting in the castings being too hard, was caused by claying the cupola with clay containing a high % of S. H. M. PLUM.

Utilization of the New Zinc Ores of Leadville. F. L. CLERC. *Mining Sci.*, 65, 187–9.—C. proposes a method of treating the new ores and discusses in detail what modifications of present furnace practices should be involved to make the process successful. H. M. PLUM.

Distribution and Treatment of Molybdenum Ores. T. L. WALKER. *Mining Sci.*, 65, 206–7.—Molybdenite is the principal Mo ore in the Canadian mines, wulfenite, so far as known, not having been found in economical quantities. The MoS_2 is described as occurring under 5 different types of formation and localities are cited where they can be found. Three methods of molybdenite conc. are given, the flotation system being regarded as promising. The uses of Mo are briefly mentioned.

H. M. PLUM.

Refining of Silver and Gold Alloys. E. F. KERN. *Met. Chem. Eng.*, 9, 443–7.—A compilation which gives in detail the parting of Dori bullion with b. conc. H_2SO_4, and by the electrolytic method as carried on both by the Moebine cell and the Balbach-Thum cell, the advantages and objections to each method being stated. The treatment of Ag-anode sludge under chem. and electrolytic methods is given and the use of a pulsating current for refining Au discussed. H. M. PLUM.

Canvas-table Tests for Recovering Lead Slimes. E. W. BUSKETT. *Mining Eng. World*, 36, 456. H. M. PLUM.

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Calculation of Blast Furnace Blast Heaters. H. GUGLER. *Stahl u. Eisen*, 31, 101–7; cf. *C. A.*, 5, 1257. J. J. M.

The Treatment of Complex Ores by Nitric Acid. H. D. RANKIN. *Mining Sci.*, 64, 200–2; *Met. Chem. Eng.*, 9, 571–3.—The treatment of mixed sulfide ores with HNO_3 is an attempt to recover the metallic contents of the so-called refractory ores. With the exception of Au the products of the process are not metals ready for refining, but salts of the metals, equivalent to high grade ores. Such an ore would contain some form of the sulfides of Fe, Cu, Pb and Zn with accompanying Au and Ag either native or combined. The process is worked intermittently on successive charges of ore and acid. About 6 tons of the ore, ground to 30-mesh size, and containing preferably about 3% S, and the HNO_3 are run into a digester to cast Fe lined with an acid-resisting mixt. If the S in the ore is under 5%, heat is necessary. This is applied by agitating with live steam at the beginning of the treatment. Once heated, the steam is replaced by air. The following equation is typical of the reaction on which the process is based: $3PbS + 8HNO_3 \longrightarrow 3PbSO_4 + 8NO + 4H_2O$. When the reaction is completed the digested mass is filtered. The residue is amalgamated for recovery of Au. The $PbSO_4$ is then sepd. from the gang by conc. The resulting slime forms a high grade Pb product for smelting. The metals in soln. are pptd. successively in a system of tanks as follows: Ag by NaCl; Fe by pulverized limestone at 55°, giving $Fe_2(OH)_6$; Cu as basic $CuCO_3$ by increasing the temp. to 75°; and the Zn by milk of lime giving $Zn(OH)_2$. The NO formed in the reaction reacts with the O admitted in the air agitation to re-form HNO_3, and by a system of towers and condensers, described in the original, 95% of the HNO_3 is recovered. L. A. TOUZALIN.

Aluminium in Ferrotitanium. H. GOLDSCHMIDT. *Met. Chem. Eng.*, 9, 485–6; cf. *C. A.*, 5, 3672.—Al is purposely added to C-free Fe-Ti containing 24% Ti. TiO_2 is known to be fused with difficulty. Al and TiO_2 react to form Al titanate, which is much more easily fusible than either TiO_2 or Al_2O_3. Expts. with the oxy-acetylene flame proved that it is almost impossible to melt either oxide alone. Mixed, however, in proper proportion, the 2 oxides melt together in a very short time. Al is a greater deoxidizer than Ti. While the Ti does deoxidize strongly it also reacts with the N. Thus when Ti is added to steel containing oxides it is consumed wholly or in part in deoxidizing. To avoid this useless consumption of Ti, Al is added simultaneously so that the oxides are first reduced by the Al. This enables the Ti to manifest itself more strongly and produces equal results with the use of smaller quantities of an alloy containing Al than with an alloy containing C. L. A. TOUZALIN.

Notes on the Han-Yeh-Ping Iron and Coal Company, China. CHO-YANG AND CHENG-FU WANG. *School Mines Quart.*, 33, 165–71.—Notes on the cost of operation and analyses of the materials are given of the above company's 3 chief plants. The equipment is described and output given. The ores consist mainly of hard hematite, some magnetite and a small amt. of limonite. L. A. TOUZALIN.

The Cyanide Plant at the Treadwell Mines, Alaska. W. P. LASS. *Bull. Am. Inst. Min. Eng.*, 62, 183–216.—The concentrates, representing 1.8% of the original ore, have already been treated by amalgamation. They contain Fe 40, S 1, SiO_2 11% and 2.5 to 4 oz. Au and 0.75 oz. Ag. The coarser portions carried the higher values; hence regrinding and re-amalgamation were suggested. Grinding in soln. of alkalinity equiv. to 2 lbs. CaO per ton kept the amalgamation plates bright. Fresh water gave a black coating which interfered. Sea water worked a little better but not so well as CaO. Agitating the ore with CaO soln. before cyaniding hastened the action and economized KCN. A further improvement was drawing the air for agitation through alk. soln. By amalgamation in the tube mills, which ground to 200 mesh, 75% Au was recovered, and by cyaniding as well extn. was 96%. The same extn. was obtained

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by cyaniding alone. A 100-ton mill in which cyaniding alone is used, gives over 97% extn. Some CaO is thrown into each of the cars carrying the concentrates from the Frue vanners, and thereafter—in storage bins or elsewhere—the ore is always covered with $Ca(OH)_2$ soln. In Pachuca tanks (ratio of ore to soln. 1 : 1.18), the strength of the soln. is brought to 1.5 lbs. KCN and 2 lbs. CaO per ton (0.075 and 1%); agitation 8 hrs. After settling, the clear soln. is run to the Au tank and a fresh lot of barren soln. added, brought to same strength and then agitated 4 hrs. The solns. are run through a clarifying press, specially devized (details given). They contain Au $10, KCN 1 lb., CaO 2 lb. per ton. Pptn. is effected with Zn dust, emulsified with a little of the soln. in a small tube mill containing 2 in. cast Zn rods. Amt. used, $^1/_2$ lb. Zn dust per ton. of soln. The mixt. is pumped directly to Merrill filter presses (pressure never above 25 lb. per sq. in.). Cheap muslin is quite as serviceable for filter cloths as the more expensive kinds. The barren soln. contains Au $0.08, KCN 1.14 lbs., CaO 1.7 lbs. per ton. and is used over and over. The ppt. from the Merrill presses contains av. Au 5.08, Zn 42.93, Pb 8.08, Cu 6.19, CaO 10.51%, besides Fe, S and SiO_2. It is treated with hot dil. H_2SO_4 (1 lb. 66° acid per lb. of ppt.). This takes out most of the Zn, CaO, etc., leaving the other metals and SiO_2—a product $^1/_4$ to $^1/_2$ of the original amt. This is smelted in an oil-burning furnace with borax, Na_2CO_3, slag shells, Fe turnings, etc., affording metal, slag, and a little Cu mat. The metal is cupelled on a limestone test, free air being introduced through a needle valve discharging into a 4-in. pipe. The bullion is refined in a Faber du Faur tilting furnace and run into bars. Av. fineness 800. E. WALLER.

Practical Application of the Specific Gravity or Moisture Flask. H. STADLER. *J. Chem. Met. Soc. S. Africa*, 12, 166–71.—The use of the sp. gr. flask as a control in milling work is strongly recommended. Preference is expressed for flasks having a large mouth ground true, the ground edge to be used as the mark of capacity. Flasks with a mark below the lip are inconvenient because of sand adhering above the mark. With a 1000 cc. conical flask errors of even 10 cc. or 10 g. affect the sp. gr. in the 3rd place only. A set of formulas is given, as aids in the estn. of solids and water in various stages of the treatment. E. WALLER.

Proposals for Improving the Removal of Iron and Slag in Blast Furnace Plants. E. LANGHEINRICH. Koblenz-Pfaffendorf. *Stahl u. Eisen*, 31, 1869–73.—Illustrated by several ground plans. A new slag ladle is described. E. J. WITZEMANN.

Magnetic Apparatus for Testing the Endurance of Steel and other Metals. ANON. *Electrician*, 68, 564.—This machine is for testing fatigue effect of metals when subjected to rapid repetition of stress. The application of the stress is by means of an electromagnet energized by an a. c. at the rate of 100 stresses per sec. With Fe practically no fatigue effect could be found when the stress was kept at about 5–6 tons per sq. in., even up to 15,000,000 applications. But when the stresses were raised to the values prevailing in modern high-speed and lightly built machinery, the fatigue effect was very noticeable. One piece of steel, with an application of only 15 tons to the sq. in. lengthened $^5/_{16}$ in. in 3 in. after only 180,000 applications, and would undoubtedly have broken under this stress if tested for a longer time. A test piece of the same steel in an ordinary testing machine did not break till a load of 26 tons per sq. in. was applied. R. W. MOORE.

Effect of Sulfur and Silicon on the Carbon Condition of Cast Iron. J. E. STEAD. *Engineering*, 90, 508–9.—Metallurgists agree that S tends to make Fe white by retaining C in the combined form and that Si promotes the decomp. of carbides. Expts. were made with 1 sample of typical high S white iron and 2 of high Si low S gray irons whose comp. was combined C 2.98, none, trace; graphite trace, 2.65, 3.300; Mn 0.29, 0.72, 0.676; Si 1.89, 5.21, 4.321; S 0.27, 0.03, 0.025; P 1.62, 1.56, 1.660%, resp. The

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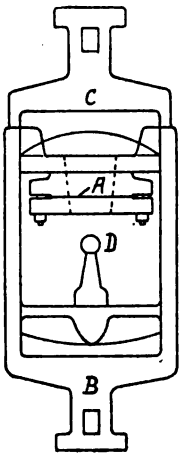
Fe-Fe-carbide eutectic in the white Fe was replaced by the ternary eutectic of Fe, P and C of Wüst. Cooling curves were detd. By melting Mn with white Fe it was shown that S crystallized with Mn as MnS previous to the solidification of the carbide, and that the metal then turned gray on cooling. The carbide was sepd. from the Fe by finely powdering the metal and extracting the Fe with 10% HCl; S was found in the insol. residue, showing that it had crystallized with the carbide. Other expts. showed that S crystallized with Fe in an unknown compd., but that not more than 0.001 part S is taken up by the Fe and that it is this S which prevents the sepn. of C as graphite. Further expts. support the view that during the freezing of Fe–C hypoeutectic alloys (<4.3% C) after the crystn. of primary austinite, and in eutectic and hypereutectic alloys, it is the carbide that is first formed which decomposes into graphite and austenite. How Si crystallizes is unknown. When low Si alloys (hypoeutectic) freeze nearly all Si crystallizes with the primary austenite; when the austenite is reduced by increasing C it becomes rich in Si and finally crystallizes as carbo-silicide along with Fe carbide; in hypereutectic alloys the Si crystallizes with the carbide at once. In Cleveland pig (1.5% P) a ternary eutectic Fe-C-P take the place of the Fe-Fe-carbide eutectic. In white Fe (3% C, <2% Si) plates of Fe carbide fell out instead of Fe-Fe-carbide. There is evidence that the primary carbosilicides are exceedingly unstable and are the first to decomp. into graphite and silico-austenite. In absence of sensible amts. of P 2 cementites—silico-carbide and carbide cementite—are formed, which crystallizes together as a eutectic mixt. The exact comp. of these is unknown but the unstable character of the first was evidently responsible for grayness of the Si-rich low-S iron used in the expts. Silicide of Fe when heated at 1000° with pure white Si-free iron decomposed the carbide in the white iron.

E. J. Witzemann.



The Perforation Test for Sheet Iron. L. Persoz. *Rev. métal.*, 8, 606–12.—This perforation test has been adapted from that used for testing paper, etc. The sample is clamped between Fe disks at *A*. The force necessary to cause *D*, which is mounted on a sliding carriage, to perforate the sheet is measured. *C* is the support for the disks. A number of results are given. E. J. W.

Contraction of Cast Iron. E. Rosenberg. Berlin. *Stahl u. Eisen*, 31, 1408–13.—An attempt is made to explain the superiority of white over gray Fe for the manuf. of castings. Calculations on the vol. relationships of the 2 kinds were made. The results are given in the table:

	Gray iron.		White iron.		Pig iron.	
	I.	II.	I.	II.	III.	IV.
Liquid.....	6.89	6.89	6.89	6.89	7.1	7.1
1000° C.....	6.75	6.46	7.22	6.91	6.9	7.2
0° C.....	7.1	7.1	7.6	7.6	7.2	7.4

These were calc. on the basis of published data on the sp. gr. of solid and molten pig iron on the coeff. of linear expansion (0.0000175 for the gray Fe columns, and 0.000033 for the white Fe columns). Figures in III and IV were obtained by calcs. (III = pig iron, 3% graphite, and 1% combined C; IV = 1% graphite and 2% combined C) based on the relative ds. of pure Fe, Fe carbide, and graphite, and sepn. of graphite from the carbide during solidification. Considering the various factors left out of consideration owing to lack of data, the 2 methods of calculation agree very well and show that there is a loss of vol. on solidification in white Fe and in

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gray Fe there is an increase of vol. which is greater the more decided the gray character of the iron. E. J. WITZEMANN.

The Physico-chemical Foundations of Metallurgy. R. SCHENCK. Breslau. *Stahl u. Eisen*, 31, 1745–52.—A lecture. E. J. WITZEMANN.

Smelting of Zinc-Lead Ores (MOULDEN, HARBORD). 4. Paint and Rusting (LIEBREICH, SPITZER). 26. Rustless Coatings for Iron and Steel (MEADE). 26.

Ger., 231,848, June 7, 1908. JONES STEP-PROCESS CO. **Rotating briquetting furnace** wherein hot reducing gases act on ores formed into blocks by means of binders.

Ger., 232,045, Aug. 15, 1909. J. WINGERTER. App. for the **continuous lixiviation of ores.**

Ger., 232,044, Dec. 21, 1909. GRÜNEWALD and WELSCH. **Ore-roasting apparatus** in which the gases from which the by-products are to be obtained are collected separately according to the acid content. A valve is provided, having 2 or more chambers, the inner valve body of which forming the fixed center of rotation for the roasting app. and being in connection with the gas conduits, while the gas collector rotating around the valve body effects the distribution of the gases to sep. collectors.

Ger., 232,081, Apr. 28, 1908. H. G. NICHOLS. **Removing solids from liquids** by means of an endless belt, applicable especially in the treatment of Au ore sludge from the cyanide process.

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10. ORGANIC CHEMISTRY.

J. BISHOP TINGLE.

Derivatives of Geraniol and Linaloöl. JUSTIN DUPONT AND L. LABAUNE. *Wiss. ind. Ber. Roure Bertrand*, 3, 3–11; through *Chem. Zentr.*, 1911, II, 138.—D. and L. have proved, by condensing geraniyl and linaloyl chlorides and bromides with the Na compds. of the malonic and acetic esters, that the condensation products of these terpene alcs. are identical. *Ester*, $C_{10}H_{17}CH(CO_2Et)_2$, from the malonic ester, Na, abs. EtOH and the hydrobromic ester, below 10°, b. p. 158–9°. Hydrolyzed with alc. KOH, the *acid* $C_{10}H_{17}CH(CO_2H)_2$ is obtained. On distillation *in vacuo* in an atm. of CO_2 this acid is converted into the *acid* $C_{10}H_{17}CH_2CO_2H$, b. p. 145–6°. *Ethyl ester*, $C_{14}H_{24}O_2$, b. p. 127–8°. This ester yields, on reduction by Na and EtOH (Bouveault and Blanc method) the *alcohol* $C_{10}H_{17}CH_2CH_2OH$, b. p. 119°, d^{18} 0.8956, n_D^{18} 1.4755. Pyroracemic ester $C_{10}H_{17}CH_2CH_2OCOAc$, b. p. 135°. Semicarbazone, m. 103°. The above compds. have only a slight characteristic odor. The acetic ester, Na, abs. EtOH and the hydrobromic ester, at 0–10° give a compd. $C_{10}H_{17}CH(COMe)CO_2Et$, b. p. 145°, which on hydrolysis with alc. KOH yields the *ketone* $C_{10}H_{17}CH_2Ac$, colorless, fairly strong though only slightly characteristic smelling liquid, b. p. 125°. Semicarbazone m. 86°. Since, on oxidation of the ketone first with $KMnO_4$ and then with CrO_3 (Tiemann and Semmler method) the chief product is levulinic acid, the ketone probably has the structure, MeCMe : $CHCH_2CH_2CMe$: $CHCH_2CH_2Ac$.

K. A. CLARK.

Two Phthaloximes and some of their Derivatives. W. R. ORNDORFF AND D. S. PRATT. Cornell Univ. *Am. Chem. J.*, 47, 89–125.—At 60° colorless phthaloxime (*a*) was prepared from soln. of phthalic anhydride, $HONH_2HCl$ and Na_2CO_3; long needles, m. 220–6° (decomp.). At 100° yellow phthaloxime (*b*) isomeric with (*a*) was obtained, m. 220–6°. Both form red isomeric *ammonium, potassium, sodium* and

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silver salts. Color of (*b*) probably due to fluorescence. (*a*) is changed to (*b*) by b. in glacial AcOH, MeOH and EtOH. No change takes place by b. in xylene. (*b*) with Ac_2O yields colorless *acetate*, m. 183–5°. *Ethyl ether* of (*a*) and (*b*) is formed by action of EtI on Ag salt; prisms m. 95–100°. The authors discuss the nature of the isomerism. T. E. LAYNG.

Three New Reactions for Aniline. JUAN B. PESET. Wiesbaden. *Anales fac. cien., Zaragoza*, 2, 22–4.—Add to a drop of $PhNH_2$, 0.5 cc. conc. HNO_3 (d. 1.4) and 1–2 drops of a conc. $KMnO_4$ soln.; a series of color changes is produced, ending finally in intense blue which becomes somewhat yellowish on adding NH_3. If 1 cc. of an aq. AcOH soln. and 0.2–0.3 g. Na_2O_2 be added to a drop of $PhNH_2$ no coloration is at first produced; on b. a canary-yellow color appears. If BaO_2 be used instead of Na_2O_2 the color is dark red. In each of the tests the colored substance can be extracted by amyl alc. which affords a means of making the test more sensitive. The last 2 reactions are quite sensitive, it being possible to detect the equiv. of 1/1600 drop of $PhNH_2$. H. S. PAINE.

Pyridoacetylcatechol and Related Bases. C. MANNICH AND O. HUEBNER. Univ. Berlin. *Ber. pharm. Ges.*, 21, 294–7.—These compds., related more or less closely to adrenaline, were prepd. by the action of chloroacetylcatechol on pyridine and other cyclic amines, as piperidine and quinoline, or in certain cases it proved more satisfactory to substitute bromoacetylveratrole for chloroacetylcatechol, with subsequent demethylation of the products of such action on cyclic amines, by heating with HCl. *Pyridoacetylcatechol hydrochloride*, $(HO)_2C_6H_3COCH_2NC_5H_5Cl$ m. 272°, was prepared by warming an alc. soln. of chloroacetylcatechol and pyridine. *Pyridoacetylveratrole hydrobromide*, $(MeO)_2C_6H_3COCH_2NC_5H_5Br$, decomp. 258°. *Piperidoacetylcatechol hydrochloride*, $(HO)_2C_6H_3COCH_2NC_5H_{11}H$, decomp. 257°. *Quinolinoacetylveratrole hydrobromide*, $(MeO)_2C_6H_3COCH_2NC_9H_7Br$, decomp. 222°. W. O. EMERY.

Constitution of Rhein. O. A. OESTERLE. *Schweiz. Wochschr.*, 49, 661–5; cf. *C. A.*, 5, 3802.—O. proves that rhein is not derived from 1,4-dihydroxyanthraquinone (quinizarin; Hesse, *C. A.*, 2, 2556; also Jowett and Potter, *J. Chem. Soc.*, 1903, 1329), nor from 1,6-dihydroxyanthraquinone (isochrysazin; Robinson and Simonsen, *C. A.*, 3, 2806) but is derived from 1,8-dihydroxyanthraquinone (chrysazin; cf. Oesterle and Riat, *C. A.*, 4, 299). S. WALDBOTT.

Decomposition of Quaternary Ammonium Hydroxides. II. J. v. BRAUN. Univ. Breslau. *Ann.*, 386, 273–303; cf. *C. A.*, 5, 3446.—*Hexamethyldecamethylenediammonium iodide*, $C_{16}H_{38}N_2I_2$, from 1,10-diiododecane by heating with Me_3N in sealed tube at 100°. White leaves, m. 231°. Converted by Ag_2O into a sirupy *hydroxide*, sol. in acid and repptd. as a mixt. of amines. *Decylenedimethylamine*, $C_{12}H_{23}N$, clear mobil liquid, b_{17} 118–20°, of faint odor and rather stable in the air. *Picrate*, orange needles from alc., m. 137°. *Methiodide*, m. 137–40°. *Tetramethyldiaminodecane*, b_{17} 157–8°. *Chloroplatinate*, red crystals from H_2O, m. 189° (decomp.). *Picrate*, m. 139–40°. The decomp. of the hydroxide gives a yield of 56% tetramethyldiaminodecane, 37% decylenedimethylamine and 6% decadiene. Dibromoheptane, heated with Me_3N, gives the *diquaternary bromide*, $Me_3NBr(CH_2)_7NMe_3Br$, leaves m. 245°, not hygroscopic. The hydroxide gives a mixt. of amines. *Heptenyldimethylamine*, $C_9H_{19}N$, liquid, b. 166–9°, of penetrating basic odor. *Picrate*, needles from alc., m. 88°. *Methiodide*, m. 120°. *Tetramethyldiaminoheptane*, $C_{11}H_{26}N_2$, odorless liquid, b. 225–30°. *Picrate*, m. 136°. *Dimethyl iodide*, cryst. powder, m. about 242°. Yield, 56% diamine, 31% unsatd. amine and heptadiene 12.5%. Diiodopentane and Me_3N give hexamethylpentamethylenediammonium iodide (*C. A.*, 5, 3446). The hydroxide yields piperylene and *tetramethyldiaminopentane*, $C_9H_{22}N_2$, mobil liquid, of faint odor, b.

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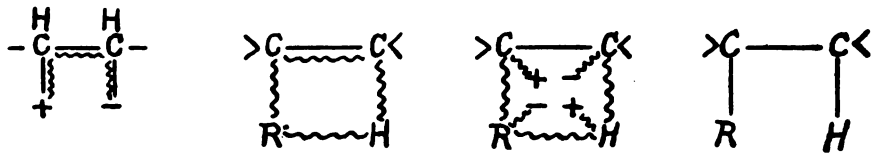
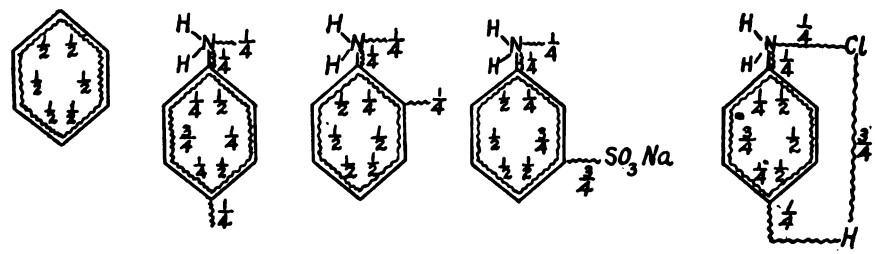
193–4°. *Chloroplatinate*, cryst. powder, decomp., 218°. *Picrate*, needles, m. 149°. Pentenyldimethylamine, identified by its methiodide, m. 200°. A. S. WHEELER.

Relation between the Sensitiveness to Light and the Constitution of Dyes. Contribution to the Theory of Valence and of the Relation between the Constitution and the Dyeing Character of a Compound. KURT GEBHARD. *J. prakt. Chem.*, 84, 561–625. —When 2 monovalent ats. or radicals mutually sat. each other completely, the compd. may be represented by the formula *A—B*. If, now, some source of energy (light, heat, electricity, pressure, etc.) acts on the compd., the bond may either be entirely broken ($A—B \longrightarrow A^+ + B^-$), or loosened to the extent, say, of $^1/_4$, in which case a "partial valence" of $^3/_4$ will still remain satd., while an "ionized valence" of $^1/_4$ will appear on each group ($A—B \longrightarrow \overset{1/4}{\frown}A\overset{3/4}{\smile}B\overset{1/4}{\frown}$). This idea differs from that of "partial valences" as generally accepted thus far in that the "partial valence" is a valence less than that typical of the group in question and not an extra, small valence. These partial and ionized valences can come into existence only at the expense of valence powers already present; hence, they will appear most easily where, as in double bond compds., labil valences or, in unsatd. at. complexes, latent valence powers favor their formation. Assume that the 2 bonds in a double bond compd. are represented by wires and that a current is induced in them; the wires will tend to assume a perpendicular position to each other, but unless a neutralizing body is present, only a fraction of the free energy will appear as an effective force, as can be represented by formula (I). By means of this conception the slow course of organic reactions can be



(I) (II) (III) (IV)

easily explained. When 2 substances having ionized valences react on each other, the ionized valences neutralize each other (II), new fractions of the partial valences again ionize (III), and the process continues until a compd. of the structure (IV) is formed. The final compd. may also have a structure similar to (II), *i. e.*, the constituents of the addendum may not be wholly sepd. (cf. Vorländer's 2 benzalpinacolin hydrochlorides). Another kind of partial valence may be produced by the tendency of a so-called unsatd. at. to assume a higher state of oxidation. According to G.'s conception, in C_6H_6 each C at. is combined with the adjoining 1 with $1^1/_2$ valences (V), and a change in this distribution of the valences is produced only by the entrance



(V) (VI) (VII) (VIII) (IX)

of substituents. The so-called firmly bound substituents (NH_2, OH) are combined with C with more than 1, the more loosely bound (SO_3Na, CO_2H) with less than 1

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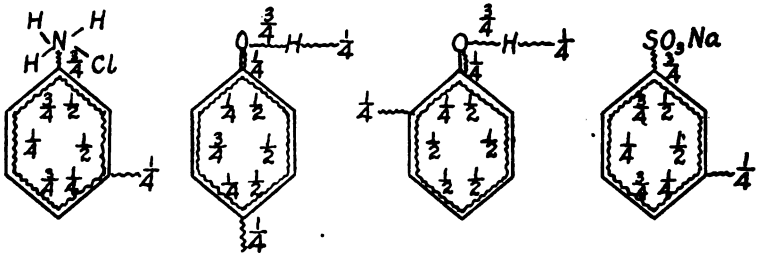
valence. In the case of satd. groups, like OH, this extra valence between the C and O can be produced only at the expense of that between the O and the H, so that the latter is more loosely bound and shows an ionized valency. In the case of unsatd. groups (NH_2), the extra valence between the C and N is accompanied by a corresponding ionization of the latent labil valence in the N at. Dividing the valences, for convenience, into $^1/_4$'s (of course, they will vary for each substance and substituent), $PhNH_2$ might be represented by (VI) or (VII). By increasing the basicity of the N as by introducing a Me group in the NH_2 radical), the affinity between the C and the N, *i. e.*, the partial valence between them, is increased, and *vice versa*. As the formulas (VI) and (VII) show, there are ionized valences in the *o*- and *p*-positions, so an NH_2 group orientates further substituents towards these positions. If the intermol. combination is such that the ionized valence can be satd., this orientating influence, of course, disappears (VIII). The formation of $PhNH_2$ salts may take place in 2 ways (IX) and (X); in the last case the N is taken as combined with C with less than 1 valence,



(X) (XI) (XII) (XIII)

as $PhNH_2.HCl$ orientates towards the *m*-position, as is characteristic of the more loosely bound radicals. Similarly, the formulas for PhOH and $PhSO_3Na$ would be (XI) or (XII) and (XIII), resp. The structure of the $C_6H_4(OH)_2$, $HOC_6H_4SO_3Na$, $ClC_6H_4SO_3Na$, the reduction products of p-$C_6H_4(CO_2H)_2$, etc., are also worked out, and the application of the conception to Werner's method of formulation is touched upon. The influence of light is 2-fold; first it produces ionization of labil bonds, then satn., the first being a very rapid, the second a relatively slow, process. G. considers a "bridge union" the color-producing element of dyes. The characteristic properties of the chromophore depend on its unsatd. nature, *i. e.*, on its ability to yield ionized valences for the bridge formation; the greater the ionization, the deeper is the color, but when the ionized valence becomes 1, in other words, becomes satd., the bridge is broken and the compd. becomes colorless. The auxochrome likewise, under the influence of light, ends to pass over into the satd. state, but in the case of the chromophore satn. is accompanied with disappearance of color, while in the effort of the auxochrome to sat. itself, ionized valences are produced, making possible the appearance of color. Illumination therefore produces bleaching only when the intensity of absorption of the chromophore exceeds that of the auxochrome, and *vice versa*. The "bridge union" in which, *e. g.*, Cl exists in malachite green, $>C{=}C_6H_4{=}NMe_2$ with Cl—H—Cl, explains, likewise, why this element cannot be detected with $AgNO_3$. As the primary process is not a chem. reaction but merely a change in the valences, the dye recovers its original color in the dark, but if, in the presence of air, the peroxide-like O (cf. *C. A.*, **5**, 1517) has had time to combine with sufficient firmness with the activated NH_2 group, the process is not reversible in the dark. The influence on the sensitiveness

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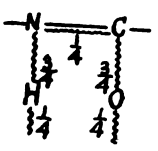
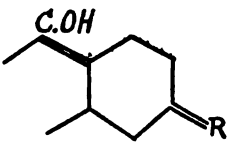
to light of NH_2, OH, SO_3H and CO_2H groups in various positions in azo dyes, and the behavior of NO_2 compds. is discussed from the point of view given above. The data are drawn both from the literature and from expts. by G. CHAS. A. ROUILLER.

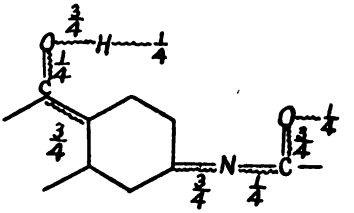
Theory of Vat Dyeing. KURT GEBHARD. *J. prakt. Chem.*, 84, 625–33; cf. preceding abstr.—While "helindone yellow 3GN" (2,2'-dianthroquinoylurea) is itself stable towards alk., yet on the fiber or when recovered from the vat liquor it is turned brown by alk. and violet by stronger alk. This is not due to replacement of the imide H by metal or to enol formation, although the reactivity of the imide H plays a part in the phenomenon (the benzyl deriv., produced on the fiber, is not sensitive to alk.). The greater reactivity of the imide H on the fiber can only be due to its being less firmly bound to the N than in the pure dye, the remaining valence of the N tending to neutralize itself with that of the C of the adjacent C : O group, 1 of the valences between C and O in the latter being correspondingly reduced (I). As this increased reactivity of the imide H is observed not only on the fiber but in the dye recovered from the vat, the dye must undergo some change in the vat and the urea residue must be involved, for introduction of radicals into the latter impedes or prevents the vat process. This change can be only in the formation of a quinone linking (II). The vat dye shows an affinity for the fiber only when it contains a C : O or corresponding unsatd. group. In the pure dye the C : O group is not sufficiently unsatd. to produce this affinity, so that in the vat process work is done in transforming the dye into the reactive form. In working out a rational formula for the vat product, partial valences must be brought in (III). In reoxidation on the fiber, the dye does not go back to its original form but



(I)



(II)



(III)

to (I) so far as the urea group is concerned; moreover there is ionized valence still present at the anthraquinone C : O group, and in this form helindone yellow is very reactive. On the other hand, the stable form is easily obtained by b. the fiber with AcOH. In the dyed product, the fiber plays the part of the bridge, combining with the ionized valences. These results confirm the conclusions of Binz and Mandowski (*C. A.*, 5, 3054) that the dye is not merely mechanically combined with the fiber but that there is a more intimate union. CHAS. A. ROUILLER.

Acid Esters of Sulfur-substituted Carbonic Acids with Aliphatic Alcohol Acids. V. BROR HOLMBERG. Med.-chem. Inst., Univ. Lund. *J. prakt. Chem.*, 84, 634–86; cf. *C. A.*, 5, 1085.—As in the case of S-substituted carbonic acid esters, the primary action of NH_3, primary or secondary amines on thiocarboglycolic acids consists in the splitting off of mercaptan and the formation of alc. or glycolic acid esters of carbamine or thiocarbamine acids: $HO_2CCH_2SCSOR + HNR'R'' = HO_2CCH_2SH + R'R''NCSOR$ or $HO_2CCH_2OCS_2R + HNR'R'' = HO_2CCH_2OCSNR'R'' + HSR$. Deviations from this course in the reaction may be caused by 2 factors: In certain cases the thiocarboglycolic acid may be decomposed by the solvent and these decomp. products or those resulting from their action with the base will be found in the resulting mixt.; and the carbamine acid derivs. may react further with the solvent or the base or pass over into anhydrides. The first product is a more or less hydrolyzed salt, and in the

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presence of an excess of base, salts of acid reaction products are formed. In *acid* soln. $HO_2CCH_2SCSOEt$ and $PhNH_2$ yield $PhNHCSOEt$ quant. The formation of $CO(NHPh)_2$ which otherwise is observed is probably due to an intermediate addition product, —S.C(OEt)(NHPh)SNH_2Ph. From $HO_2CCH_2OCS_2Et$ (18 g.) and $PhNH_2$ in alc. the only definit product isolated was $CO(NHPh)_2$ (2.5 g.); in aq. soln. only the *aniline salt* of the acid, m. 77.5–78°, is obtained. $HO_2CCH_2SCSOCH_2CO_2H$ with 2 mols. $EtNH_2.HCl$ and 4 mols. KOH gives $HO_2CCH_2S_2CNHEt$, either directly splitting off $HOCH_2CO_2H$ or, more probably, first acting like an alk. and forming $(HO_2CCH_2S)_2CS$ (see below) and then splitting off HO_2CCH_2SH. With $PhNH_2$, which is a much weaker base, the reaction is much more complicated. The *neutral aniline salt*, spherical aggregates of pale yellow leaves, m. 97–7.5°, is obtained by adding 9.5 g. $PhNH_2$ in 50 cc. Et_2O to 11 g. acid in 200 cc. Et_2O. *Acid aniline salt*, from $^1/_2$ as much base, coarsely cryst., pale yellow mass, m. 110–0.5° (slight decomp.). Both decomp. in H_2O, slowly at room temp., much more rapidly on heating. The nature and relative amts. of products obtained from the acid and $PhNH_2$ in H_2O vary with the proportions taken, the temp. and the duration of the reaction. With 1 mol. of each at 80° for 2 hrs. were obtained H_2S, $CS(NHPh)_2$, phenylrhodanin, $(HO_2CCH_2S)_2CS$, $HSCH_2CO_2H$, $HOCH_2CO_2H$, $CO(NHPh)_2$ and $HO_2CCH_2OCSNHPh$. If the heating is continued longer, the yield of the last is increased about 10%, that of phenylrhodanin doubled. Heating at 60° or 100° changes the velocity of the reaction but not the relative amts. of the products. When 2 mols. $PhNH_2$ are used to 1 of acid, the amt. of $CS(NHPh)_2$ is increased and $PhNHOCCH_2OCSNHPh$ is also obtained. From $CO(SCH_2CO_2H)_2$ and 1 mol. $PhNH_2$ in H_2O were obtained $HSCH_2CO_2H$ and $HSCH_2CONHPh$, together with very small amts. of $(PhNHCOCH_2)_2S_2$. The reaction therefore consists in the formation of $PhNHOCCH_2SCONHPh$, which is then decomp. by H_2O.$(NaO_2CCH_2S)_2CS$ and 2 mols. $EtNH_2.HCl$ in 2 mols. KOH give $HO_2CCH_2S_2$-$CNHEt$, isolated through the condensation product of its anhydride with BzH. With $PhCHMeNH_2$ is obtained *N-phenylethylrhodanin*, PhCHMeN.CS.S.CH_2CO, pale yellow, irregular tables, m. 111–2°. $HO_2CCH_2SCS_2Et$ gives the same products as the preceding acid (cf. *C. A.*, **5**, 1085), but as $CS(SEt)_2$ is insol. in H_2O, it forms no decomp. products. *Ethyl thiocarbamineglycolic acid*, $HO_2CCH_2OCSNHEt$, from HO_2CCH_2-OCS_2Et and $EtNH_2.HCl$ in aq. KOH, needles or prisms grouped in stars, m. 97.5–8.0°, sol. in 15 pts. H_2O at room temp. *Barium salt*, tables with 3 H_2O. In soln. the acid rapidly passes into the *anhydride*, needles or prisms, m. 40–0.5°, very slightly sol. in cold H_2O, easily sol. in alc., Et_2O or glacial AcOH, and in alk. In neutral soln. the acid very slowly decomp., the soln. becoming alk.; in alk. soln. it gives $EtNH_2$ and $HOCH_2CO_2H$. Aq. Br oxidizes it to $HO_2CCH_2OCONHEt$. *Diethylthiocarbamine-glycolic acid*, obtained by using Et_2NH instead of $EtNH_2$, flat prisms, m. 90.5–1.0°. *Sodium salt*, prismatic crystals. *Lead salt*, microscopic needles. *Ethyl ester*, obtained by satg. an abs. alc. soln. of the acid with HCl, oil, sol. in conc. NH_3 without sepn. of amide. The acid is unchanged by heating in H_2O or H_2O containing $PhNH_2$, very slowly decomp. in neutral soln., quickly in alk. soln. with liberation of Et_2NH. *Phenylthiocarbamineglycolic acid* (see above), sep. with 1 mol. AcOH in colorless prisms which effloresce in the air and then m. 111–2° (slight decomp.). *Sodium salt*, microscopic crystals in cauliflower-like aggregates. *Barium salt*, leaves or thin tables with 3 H_2O. On heating the acid in H_2O or its salts in AcOH, it is easily converted into its anhydride, *N-phenyl-α-keto-μ-thioketo-oxazolidine*, thick, irregular tables or short prisms, m. 172–3°. In hot neutral soln. the acid slowly forms $CS(NHPh)_2$. In alk. soln. the decomp. is more rapid. With conc. NH_3, the acid gives $PhNHCSNH_2$. With 2 mols. $PhNH_2$ in H_2O, it yields the *anilide*, $PhNHOCCH_2OCSNHPh$ (see above), needles, m. 133–4°. $KMnO_4$ oxidizes the acid to $HO_2CCH_2OCONHPh$. The reactions

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of the above anhydrides show that they have the structure, RN.CS.CH_2.O.CO, of α-keto-μ-thioketo-oxazolidines. Br oxidizes them to the corresponding diketo compds. The N-phenyl compd., when treated with alc. NaOEt, slowly solidifies to a gelatinous mass which dissolves in AcOH and from the soln. is obtained an addition product with alc., *N-phenyl-α-keto-μ-ethoxymercapto-oxazolidine*, PhN.CO.CH_2.O.C(OEt)SH, needles or slender prisms, m. 73–3.5°; HCl converts it back into its components. The gelatinous Na salt reacts easily with EtI, giving NaI, NaSEt and $PhNHCO_2CH_2CO_2Na$; with $ClCH_2CO_2Et$, it gives PhN.CO.S.CH_2.CO. In another expt., after the reaction between the Na salt and ester had taken place, NaOH was added; on evapn. of the acidified soln. it deposited *diphenylisohydantoin*, CO.CH_2.O.C(: NPh).NPh, needles or flat prisms, m. 171–2°. With $ClCH_2CONHPh$, the Na salt above gives a *compound* $C_{15}H_{12}ON_2S$, m. 174–5°, which must have the structure PhN.C(: NPh).S.CH_2.CO or PhN.CO.S.CH_2.C : NPh. If the Na salt is allowed to stand in the soln. in which it is prepared for a long time, it is converted into $NaO_2CCH_2OCSNHPh$, while if the soln. is b., EtOSCNHPh is formed. Piperidine likewise forms addition products with the above anhydrides. *N-Ethyl-α-keto-μ-piperidylmercapto-oxazolidine*, prisms, m. 146–7°. *N-Phenyl derivative*, needles, m. 130–2°. EtN.CS.O.CH_2.CO gives, with BzH and NaOEt, O.CHPh.CHPh.CO.CO; the N-phenyl deriv. gave the same compd. and $CS(NHPh)_2$ was also isolated. With piperidine or Ac_2O as condensing agent was obtained, from the *N*-ethyl deriv., *N-ethyl-α-keto-β-benzylidene-μ-thioketo-oxazolidine*, EtN.CS.O.C(: CHPh).CO, tables or short prisms, m. 94.5–5.0° (prepared with piperidine), long, faintly yellow prisms or needles, m. 137.5–8.0° (prepared with Ac_2O). The 2 products are probably *cis-trans* isomers. They cannot be transformed into each other. The *N-phenyl derivative*, slender, golden yellow needles, m. 181.5–2.0°, obtained with Ac_2O; piperidine gives no definit product. In the same way as described above, from the phenylrhodanins can be obtained ethoxymercaptans, showing that the former contain a C : S group. Thus phenylrhodanin and NaOEt give *N-phenyl-α-keto-μ-ethoxymercaptothiazolidine*, PhN.CO.CH_2.S.C(OEt)SH, flat, prismatic needles, m. 61.5–2.0°; it easily loses alc., going back to the rhodanin. With piperidine is obtained *phenylpiperidylthiourea*, PhNHCSN : C_5H_{10}, thin prisms, m. 100–0.5°, a piperidine salt of a piperidylmercaptothiazolidine being probably first formed.

CHAS. A. ROUILLER.

Aliphatic Nitro Compounds. XII. Constitution of *aci*-Nitro Compounds. WILHELM STEINKOPF AND BORIS JÜRGENS. Chem. Inst. Techn. Hochsch., Karlsruhe. *J. prakt. Chem.*, 84, 686–713; cf. *C. A.*, 5, 3234; 6, 233.—The formation of hydroxamic acid chlorides by the action of HCl (or $SOCl_2$) on nitro compds. might be represented as follows: RCH : NOOH ⟶ RCHO + >NOH ⟶ RCH(OH)NO $\xrightarrow{HCl}$ RCHClNO ⟶ RCCl : NOH. As is well known, *aci*-nitro compds. decomp. easily into aldehydes and nitrosyl, and aldehydes and nitrosyl form hydroxamic acids. That a nitroso compd. is an intermediate product in the last reaction is shown by the blue or green colors obtained on acidifying solns. of salts of nitroparaffins in aq. or Et_2O soln. Attempts were made to isolate these substances. In the case of $MeNO_2$ and $PrNO_2$, the blue solns., on evapn., yielded colorless oils of penetrating odor which

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could not be made to solidify. When HCl was passed into a dil. Et_2O soln. of Na nitroethane for some time (5 min.), however, MeCHClNO (Piloty and Steinbock, *Ber.*, 35, 3113) was obtained. That MeCCl : NOH was doubtless formed was shown by the fact that when HCl was passed in until the blue color disappeared and the soln. was allowed to stand a long time, it finally deposited MeC(NHOH) : NOH.HCl (Wieland, *Ann.*, 353, 86), probably formed by the reaction of NH_2OH, resulting from a partial decomp. of MeCCl : NOH, upon the latter. When only a little Et_2O was used and an excess of HCl was avoided, $MeC(NO_2)$: NOH was obtained, doubtless due to the splitting off, from the MeCH(OH)NO first formed, of HNO_2 and the reaction of the latter on the $EtNO_2$. When negative substituted nitro compds. ($O_2NCH_2CO_2Et$, $O_2NCH_2CONH_2$, O_2NCH_2CN, methazonic acid, etc.), however, are treated with HCl, no blue or green color is produced, *i. e.*, there is no scission into aldehyde and nitrosyl. $PhCH_2NO_2$ occupies an intermediate position; a blue color slowly appears when HCl is passed into its Et_2O soln., which disappears after about 1 hr.; after standing overnight, PhCCl : NOH is obtained, identified through its conversion into diphenylfuroxane. O_2NCH_2Bz, on the other hand, is converted, without the slightest appearance of a blue or green color, into BzCCl : NOH. This difference in behavior between non-substituted and negative-substituted nitro compds. is best explained by assuming for the *aci*-nitro compds. the old Hantzsch formula, $RCH{<}^{NOH}_{O}$. In the nitroparaffins, the ring has such slight stability that it breaks open both between the C and N and between the N and O, while if there are negative substituents its stability is increased and it opens only between the C and O, giving true nitro compds., or between the N and O with formation of hydroxamic acids. A detailed discussion of the other properties of *aci*-nitro compds. is given, showing that the Hantzsch formula explains them better than the Michael-Nef formula which is now so generally adopted.

CHAS. A. ROUILLER.

Atrolactinic Acid. LENNART SMITH. Univ. Lund. *J. prakt. Chem.*, 84, 731–43.—The acid was prepared essentially by Spiegel's method. The effect of varying conditions in the prep. of the cyanohydrin and its hydrolysis is briefly discussed. Its solubility in H_2O at 18°, 25° and 30° is 17.04, 21.17 and 25.65 g. per l., resp. Elec. cond. at 25°, 26.34 for *V* 16 to 163.1 for *V* 1024; *K* 0.0341. It does not lose its 0.5 mol. of H_2O in the air (Lund), and not completely over H_2SO_4 after 5 months. *Potassium salt*, rectangular tables with 2 H_2O. *Sodium salt*, rectangular tables with 2 H_2O. *Magnesium salt*, needles with 2 H_2O. *Acid calcium salt*, needles grouped in hard balls, m. 216° (decomp.). It is sepd. into its active components by fractional crystn. of the *l*-$PhCHMeNH_2$ salts. The acid liberated from the less sol. salt by addition of H_2SO_4 and extraction with Et_2O forms silky rods, 4–5 cm. long, or thick prisms, m. 116.5–7.0°, losing H_2O near its m. p.; $[\alpha]_D$ 50–2° in H_2O at 13–20° (the temp. coeff. seems to be slightly negative); solubility at 18°, 25° and 30°, 52.0, 64.3 and 76.2 g. per l., resp. *Barium salt*, sep. with 0.5 H_2O. *Calcium salt*, hexagonal tables with 3.5 H_2O. *Potassium salt*, silky needles with 2 H_2O. The *l*-acid was obtained by liberating it from the mother liquors of the *l*-$PhCHMeNH_2$ salt of the *d*-acid above, converting it into the *d*-$PhCHMeNH_2$ salt and setting it free as before; m. 116°, $\alpha]_D^{20}$ —52.0°. The conversion of atrolactinic acid by conc. HCl seems to proceed through the stages atropaic, $ClCH_2CHPhCO_2H$, isoatropaic acids.

CHAS. A. ROUILLER.

Separation of Mandelic Acid into its Active Components by means of Phenylethylamine. LENNART SMITH. *J. prakt. Chem.*, 84, 743–4.—Using the method described in the preceding abstr., mandelic acid was sepd. into 2 components showing α_D 4.57° and —4.57°, resp.

CHAS. A. ROUILLER.

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α-Phenyl-α-ethylglycolic Acid. LENNART SMITH. *J. prakt. Chem.*, 84, 744–5; cf. preceding abstr.—The acid, prepared by allowing BzEt to stand 2 days with 1.25 mols. of 99% AcOH and 1.1 mols. KCN and hydrolyzing with NaOH, needles, m. 132° (cor.); about 6 g. dissolve in a l. of H_2O at room temp. By means of *d*-PhCHMeNH$_2$ it is resolved into a component showing $[\alpha]_D^{18}$ —14°. CHAS. A. ROUILLER.

Transformations of Thio- and Seleno-phosphoric Esters. P. PISTSCHIMUKA. Inst. Nowoalexandria (Gouv. Lublin). *J. prakt. Chem.*, 84, 746–60; cf. *C. A.*, 3, 431.—P_2S_5 and EtOH give a dithionphosphoric acid (cf. Carius, Heidelberg, 1861, who claims that an ester, $PS_2O_2Et_2$, is formed), whose Pb salt yields, with EtI, an *ester*, $PS_2O_2Et_2$, b_{20} 130°, d_0^0 1.1340. Michaelis' EtSPCl$_2$, from PCl$_3$ and EtSH, when heated with S in a sealed tube, give the *compound* SPCl$_2$SEt, b_{10} 92°, d_0^0 1.4453, which, with NaOEt, forms an ester identical with that obtained from the Pb salt above. SPCl$_2$OEt, from PSCl$_3$ and EtOH, gives with EtSNa the *ester* SP(SEt)$_2$OEt, b_{30} 155°, d_0^0 1.1716, unstable in the air. Of the complexes with metallic salts ($HgCl_2$, HgI_2, $FeCl_3$, $FeBr_3$, $PtCl_4$, $AuCl_3$, $AgNO_2$, $AgNO_3$) which these thiophosphoric esters form, in some the components remain unchanged, while in others there is a partial decomp. resulting in either a loss of organic radicals or of halogen atoms (in the case of the halides). Moreover, at a certain temp., which is definit for each complex, the ester of the acid with which the metallic salt was combined is split off, leaving the salt of the thiophosphoric acid alone or also that of the complex acid. Thus SP(OMe)$_3$.2HgCl$_2$, needles, m. 102°, at its m. p. decomp. into MeCl and OPSHgCl(OMe)$_2$.HgCl$_2$, and at 150° another mol. of MeCl is evolved, with formation of OP(SHgCl)(OMe)OHgCl. SP(OEt)$_3$ and HgCl$_2$ in Et$_2$O give directly the *compound* OP(OEt)$_2$SHgCl.HgCl$_2$, thick prisms, m. 66°, which, at 85°, lose 1 mol. EtCl. The *n*-Pr and Me$_2$CHCH$_2$ esters form oils of the comp. SP(OR)$_3$.2HgCl$_2$ which lose 1 mol. RCl at 80° and 92°, resp. Similarly SP(OEt)$_2$SEt yields an oil which loses 1 EtCl at 70°. The *compound* SP(SEt)$_2$OEt.2HgCl$_2$, needles, m. 81°, loses EtCl at 82°. The *compound* SP(SEt)$_3$.2HgCl$_2$, m. 84°, does not lose EtCl (characteristic of compds. containing no OR group), but is decomp. into its components in b. ligroin. The *compound* 3SP(OMe)$_3$.2FeCl$_3$, yellow prisms, m. 125°, loses 3 mols. MeCl at 126°, forming $P_3S_3O_9Me_6Fe_2Cl_3$. The *compound* 3SP(OEt)$_3$.2FeCl$_3$, yellow, strongly hygroscopic crystals, behaves similarly at 90°. The Pr and Me$_2$CHCH$_2$ esters, as well as the Et esters of the di- and trithio acids, form oils of similar comp. and properties. The *compound* 3SP(OMe)$_3$.2FeBr$_3$, red crystals, m. 99°, loses 3 MeBr at 120°. The *compound* 3SP OEt)$_3$.2PtCl$_4$ is obtained in orange-yellow needles, m. 103°. SP(OMe)$_3$ gives with AuCl$_3$ a cryst. *compound*, m. 110°. $AgNO_3$ dissolves in SP(OMe)$_3$ with formation of $MeNO_3$ and OP(OMe)$_2$SAg. SP(OEt)$_3$ gives an *oil*, SP(OEt)$_3$.$AgNO_3$, which slowly decomp. at room temp., more quickly on heating, into $EtNO_3$ and the *compound* OP(OEt)$_2$SAg, m. 82°. The Pr and Me$_2$CHCH$_2$ esters behave similarly. The Ph ester gives *o*-$O_2NC_6H_4OH$ and OP(OPh)$_2$SAg. $AgNO_2$ acts in the same way as $AgNO_3$. The HgI_2 compds. cannot be prepared by dissolving the components together; once formed, they decomp. into their components on b.; on heating at high temp. they decomp. completely without, however, the sepn. of RI (see below, Se compds.). When heated 3 days at 120° with NH_3 in abs. alc., SP(OEt)$_3$ gives $EtNH_2$ and OP(OEt)$_2$NH$_2$ (the latter resulting from the decomp. of OP(OEt)$_2$SNH$_4$ with elimination of H_2S). In the action of PSCl$_3$ on NaOR, there is always formed, besides the ester SP(OR)$_3$, a certain amt. of a salt OP(OR)$_2$SNa; this same salt is obtained by the action of NaOH, NaSEt or NaOEt on the esters. With the di-, tri- and tetrathio esters, NaOH and NaOR split off mercaptans or sulfides, while NaSEt gives salts of the comp. OP(SNa)(SEt)OEt and OP(SEt)$_2$SNa. Aq. NH_3 behaves similarly, forming salts which, when heated with dry Et$_2$O and alc., yield amides of H_3PO_4. The above Ag

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salts, with alkyl iodides, give esters, $OP(OR)_2SR$, isomeric with those from which the salts themselves were obtained (cf. the earlier paper). The Se esters are obtained by the action of mol. Se on the corresponding S esters. The *compound* $SeP(OMe)_3$, b_{20} 95°, d_0^0 1.5387. *Ethyl ester*, b_{20} 117°, d_0^0 1.3189. They form oily compds., $SeP(OR)_3.HgCl_2$, which lose 1 RCl at 50° and 54°, resp. Unlike the S esters, they easily combine with HgI_2. The *compound* $SeP(OMe)_3.HI_2$ m. 66°, forming $OP(OMe)_2SeMe.HgI_2$. The *compound* $SeP(OEt)_3.HgI_2$, yellow prisms, m. 32°; at 78° it passes into the *compound* $OP(OEt)_2SeEt.HgI_2$, m. 95°, which can also be easily obtained from its components. When $SeP(OEt)_3.HgI_2$ is heated *in vacuo*, there is also obtained a salt $OP(OEt)_2SeHgI$ (and EtI) which, with EtI, gives quant. the above salt $OP(OEt)_2SEt.HgI_2$. The isomerization therefore consists in a decomp. into a salt and EtI; the latter reacts with the salt, forming the isomeric ester and HgI_2; and these 2 combine. $SeP(OEt)_3$ and NaSEt give the *compound* $OP(OEt)_2SeNa$, m. 196°. The corresponding, unstable Pb salt forms, with EtI, the *ester* $OP(OEt)_2SEt$, b_{20} 140°, d_0^0 1.3593. Alkyl iodides produce a similar, slower isomerization at higher temp., but the reaction is complicated by a secondary reaction between the isomers thus formed and the iodides, giving rise to iodosulfines and isomeric free acids, but as this secondary reaction is slower than the other, more or less of the isomeric ester can always be obtained. The addition products are probably compds. of tetra- or hexavalent S or Se, like $Ag(NO_3)S : P(OR)_3$, which pass over at a definit temp. into a tautomeric form $AgSP(OR)_3(NO_3)$ which, in turn, losing RNO_3, gives $AgSPO(OR)_3$.

CHAS. A. ROUILLER.

Trinaphthylmethane Compounds. A. E. CHICHIBABIN. Moskau. *J. prakt. Chem.*, 84, 760–77.—*α,α*-Dinaphthylketone, obtained from the carbinol and $K_2Cr_2O_7$ in H_2SO_4, yellow prisms, m. 98° (possibly a dimorphic form of Schmidlin and Massini's product, *C. A.*, 3, 2558), gives, when treated with *α*-$C_{10}H_7MgBr$ in Et_2O and subsequently decomp. with aq. AcOH in an atm. of CO_2, *α,α,α-trinaphthylcarbinol*, identical with S. and M.'s "labil" carbinol. It seps. with 1 Et_2O or 1 C_6H_6; when the former is pptd. from AcOEt by petroleum ether, it forms prismatic crystals without solvent of crystn., m. 140–60° (apparently with some decomp., although the melted product seps. unchanged from C_6H_6). All the forms are stable in CO_2 but are easily oxidized in the air, especially the free carbinol and the Et_2O compd.; the C_6H_6 compd., when dry, is oxidized very slowly. In AcOH it easily forms, with HI, *trinaphthyliodomethane*, needles from C_6H_6, decomp. 159°; on b. in various solvents, it decomp. more or less, depending on the temp. It is also obtained from the carbinol and I in C_6H_6, without liberation of HI. *Bromide*, m. 178° (decomp.). In C_6H_6 the carbinol absorbs about 0.85 mol. of O, the soln. becoming yellow towards the end and depositing drops looking like H_2O; on treatment with H_2O, it gives the reactions of H_2O_2; the C_6H_6 soln., on conc., deposits S. and M.'s "stable" carbinol. A better yield of this product is obtained by oxidation with neutral $KMnO_4$. It is *α-naphthyldi-α,α-naphthofluoryl alcohol*, $C_{31}H_{20}O$. When b. in glacial AcOH with HBr, it gives the *bromide*, intensely lemon-yellow, cryst. powder from C_6H_6, decomp. 215–8°, sol. in conc. H_2SO_4 with intense blue color. Similarly, the reduction product of the carbinol or bromide is *α-naphthyldi-α,α-naphthofluorene*, and not $(C_{10}H_7)_3CH$, as previously supposed (*C. A.*, 5, 2833). C. A. R.

Bornylene from *β*-Iodobornylenecarboxylic Acid, Dibromobornylenecarboxylic Acid and Dihydrobornylenecarboxylic Acid. J. BREDT AND W. HILBING. Aachen. *J. prakt. Chem.*, 84, 778–86; cf. *C. A.*, 3, 2797.—*β-Iodohydrobornylenecarboxylic acid*, from the bornylene acid and HI in glacial AcOH, needles, m. 129–30°; *sodium salt*, radiated crystals. With b. alk. it behaves like the Cl and Br analogs. When the bornylene (3 g.) so obtained is heated in sealed tubes at 70° for 16 hrs. with 75 g. glacial AcOH and 4 g. of 50% H_2SO_4, it gives an acetate (cf. Wagner and Brykner,

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Ber., 36, 4602), b_{14} 103–4°, which, on hydrolysis, yields a non-homogeneous borneol, m. 175–8°. *Dibromobornylenecarboxylic acid*, from the bornylene acid and Br in CCl_4, needles, m. 159–60°. *Hydrobornylenecarboxylic acid chloride*, b_{14} 114–5°. *Amide*, m. 166–7°. CHAS. A. ROUILLER.

Electro-reduction of Camphononic Acid to *cis*- and *cis-trans*-Camphonolic Acids, and Camphonolactone. J. BREDT. *J. prakt. Chem.*, 84, 786–99; cf. *C. A.*, 5, 2816.—Camphononic acid is obtained in 67–9% yield by first preparing the hydroxycamphoraminic acid (Auwers and Schnell, *Ber.*, 26, 1528) from camphanamide and treating the Na salt with the calc. amt. of Br and NaOH. By electro-reduction in K_2CO_3 with K–Hg cathode (cf. *C. A.*, 3, 2797), it yields a mixt., m. sharply at 199°, of camphonolic acids, which on distillation, lost H_2O, and was sepd. into the lactone of *cis*-camphonolic acid and *cis-trans*-camphonolic acid. The same results are obtained, but much more slowly, with K-Hg alone without the elec. current. With HBr the above lactone gives *γ-bromocamphonanic acid*, m. 146–7°. Both the lactone and the *cis-trans* acid are oxidized by HNO_3 to camphoronic acid, and as camphononic acid yields the same compd., it must be an intermediate product in the above oxidation. C. A. R.

Action of Semicarbazide on Hydroxamic Acids. H. RUPE AND F. FIEDLER. Univ. Basel. *J. prakt. Chem.*, 84, 809–16; cf. *C. A.*, 4, 773; 5, 1100.—A few, but not all, hydroxamic acids react with $H_2NCONHNH_2$, with replacement of the =NOH by =NNHCONH$_2$. Thus, from PhC(OH) : NOH and $H_2NCONHNH_2$.HCl, heated in H_2O 3–4 hrs., was obtained the *compound* PhC(OH) : NNHCONH$_2$, leaflets, m. 215°, very difficultly sol. in most solvents but easily sol. in alk., identical with Widmann and Cleve's "benzoylsemicarbazide," (*Ber.*, 31, 381); the higher m. p. given by them (225°) is due to the presence of hydrazodicarboxamide (m. 243–6°). *Acetyl derivative*, silky leaflets, m. 174°. The compd. is also obtained in very small amt. by the action of $H_2NCONHNH_2$ on BzOEt, in the presence of NaOEt. Salicyl- and cinnamylhydroxamic acids do not react. *Cinnamoylsemicarbazide*, from the anhydride and $H_2NCONHNH_2$ at 130°, needles. *Acetyl derivative*, needles, m. 177–8°. *Phenylacetylsemicarbazide*, from the anhydride, needles, m. 167–8°. It can also be obtained from the chloride and (with very small yield) from the hydroxamic acid. MeC(OH) : NOH gives W. and C.'s acetylsemicarbazide. CHAS. A. ROUILLER.

Cyclic Ammonium Bases. J. GADAMER. *J. prakt. Chem.*, 84, 817–20.—Answer to Decker and Kaufmann (*C. A.*, 6, 75). CHAS. A. ROUILLER.

Cyanoanilino-*o*-carboxylic Esters. RALPH H. MCKEE. Univ. Maine, Orono, Me. *J. prakt. Chem.*, 84, 821–6; cf. Finger and Zeh, *C. A.*, 4, 2285.—F. and Z.'s supposed NCNHC$_6$H$_4$CO$_2$Et is really an isourea ether, $C_6H_4\begin{cases}CO.N\\ \|\\ NH.COEt\end{cases}$ or $C_6H_4\begin{cases}CO.NH\\ |\\ N:COEt.\end{cases}$ It is easily sol. in both dil. acids and alk. If their formula were correct, NCC(OMe) : NH should give the above compd. with *o*-$H_2NC_6H_4CO_2Et$. As a matter of fact, this *methyl cyanoimidocarbonate*, b. 115°, obtained from dil. MeOH, KCN and Cl, gives with $H_2NC_6H_4CO_2Et$ and CuCl, *methylisobenzoyleneurea*, $C_6H_4\begin{cases}CO.N\\ \|\\ NH.COMe,\end{cases}$ microscopic sheaves, m. 231–2° (cor.), decomp. into benzoyleneurea, m. 356°, on heating 10 min. on the H_2O bath with HCl. The true *methyl cyanoanilino-o-carboxylate*, from BrCN and *o*-$H_2NC_6H_4CO_2Me$ in Et_2O, needles, m. 105° (cor.), easily sol. in alc., dil. alk. and conc. acids, but only very slightly in dil. acids; at 100°, it is converted into a substance m. about 160°, insol. in alk., sol. in acids and alc., evidently *tricarboxymethylphenylmelamine*, $(C_9H_8O_2N_2)_3$. *Ethyl cyanoanilino-o-carboxylate*, m. 93–4°; *melamine*, m. 190°. Methyl anthranilate is best characterized through its *picrate*, deep yellow

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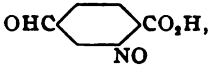
microscopic needles, m. 106° (cor.), sol. in 330 pts. H_2O at 21°. *Ethyl ester picrate*, m. 116° (cor.). In a later paper (*C. A.*, 5, 1904), Finger recognizes his error.

CHAS. A. ROUILLER.

Photochemical Behavior of Nitroterephthalaldehyde. HERMANN SUIDA. Wien. *J. prakt. Chem.*, 84, 827–30.—The clear, wine-yellow soln. of the aldehyde in cold xylene, when exposed to direct sunlight, soon becomes turbid and solid yellow particles begin to deposit in a few moments (0.8 g. from 1 g. of the aldehyde after 8 hrs.). They consist of *nitrosoterephthalaldehyde acid*,



carbonizes 250–300° when heated slowly, m. (decomp.) at once when dipped into the bath at 300°, practically insol. in ordinary solvents, sol. in hot glacial AcOH and in alk.; in conc. H_2SO_4 containing a little PhOH, it gives in the cold an emerald-green color, when hot a deep brownish black; on diluting with H_2O and adding excess of KOH, it changes to a faint reddish yellow. As the rays from an elec. arc. produce the phenomenon, this reaction can be used for lecture purposes. C. A. R.

Formation of Cork. M. VON SCHMIDT. Wien. *J. prakt. Chem.*, 84, 830–2.—Answer to Zeisel (*C. A.*, 6, 78). CHAS. A. ROUILLER.

Relations between Constitution and Phototropy. M. PADOA AND F. BOVINI. *Atti accad. Lincei*, 20, II, 712–7; cf. *C. A.*, 5, 3404.—The behavior towards light of the following compds. accords well with the generalizations previously drawn. *Benzil-α-naphthylosazone*, $C_{10}H_7NHN : CPhCPh : NNHC_{10}H_7$, lemon-yellow crystals, m. 175°, non-phototropic. *Piperil-α-naphthylosazone*, yellow needles, m. 189°; phototropic, turning brick-red in a few sec. in sunlight and again losing its color in the dark in 10 min. or when heated to 50°. *Anisil-α-naphthylosazone*, golden yellow needles, m. 155°; turns brick-red in diffused light, garnet-red in sunlight; decolorized after 6 hrs. in the dark or when heated to 95°. *Piperonal-α-naphthylhydrazone*, greenish yellow needles, m. 147°, non-phototropic. *Salicylaldehyde α-naphthylhydrazone*, golden yellow needles, m. 134°, non-phototropic. *Vanillin-α-naphthylhydrazone*, yellowish cryst. powder, non-phototropic. *p-Tolualdehyde α-naphthylhydrazone*, greenish yellow needles, m. 152°, non-phototropic. *Benzil-1,3,4-xylylosazone*, orange-yellow cryst. mass, m. 71–2°, turns a deeper yellow in the light. *Piperil-1,3,4-xylylosazone*, lemon-yellow prisms, m. 187°; turns red in the light and is decolorized in less than 1 hr. in the dark or at 70°. *Anisil-1,3,4-xylylosazone*, orange-yellow crystals, m. 75°, turns a deeper orange in the light. *Cuminil-1,3,4-xylylosazone*, yellow crystals, m. 64–70°, non-phototropic. CHAS. A. ROUILLER.

Chemical Action of Light on Vanillin and its Ethers. E. PUXEDDU. Univ. Cagliari. *Atti accad. Lincei*, 20, II, 717–23.—Vanillin, exposed to sunlight in EtOH, C_6H_6, PhMe or AcOEt, yields dehydrovanillin (either in an atm. of air or CO_2). The Me and Et ethers yield the corresponding CO_2H acids. No other products (such as reduction products) could be isolated. CHAS. A. ROUILLER.

Strychnine and Brucine. III. R. CIUSA AND G. SCAGLIARINI. *Gazz. chim. ital.*, 41, II, 747–53; cf. *C. A.*, 5, 3809. CHAS. A. ROUILLER.

Essence of Bupleurum fruticosum Linn. Action of Nitrosyl Chloride. Nitrosochlorides. L. FRANCESCONI AND E. SERNAGIOTTO. *Gazz. chim. ital.*, 41, II, 580–90; cf. *C. A.*, 5, 3879; 6, 137. CHAS. A. ROUILLER.

Hydroxyhydroquinone Derivatives. V. G. BARGELLINI AND S. AURELI. **VI.** G. BARGELLINI AND E. MARTEGIANI. *Gazz. chim. ital.*, 41, II, 590–603, 603–12; cf. *C. A.*, 5, 3683, 3808. CHAS. A. ROUILLER.

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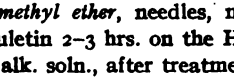
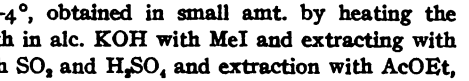
Derivatives of Hydroxyhydroquinone. VII. G. BARGELLINI AND E. MARTEGIANI. Ist. chim. r. univ. Roma. *Gazz. chim. ital.*, 41, II, 612–8.—1,3,4-$(AcO)_2C_6H_3$ condenses in 73% H_2SO_4 with MeC(OH) : $CHCO_2Et$, forming *β*-methylesculetin (Pechmann and Krafft, *Ber.*, 34, 423). *Diacetate*, m. 149–51°. *Dibenzoate*, needles, m. 152°. *Dimethyl ether*, needles, m. 130–4°, obtained in small amt. by heating the methylesculetin 2–3 hrs. on the H_2O bath in alc. KOH with MeI and extracting with Et_2O; the alk. soln., after treatment with SO_2 and H_2SO_4 and extraction with AcOEt, yielded the *monomethyl ether*, slightly yellow needles, m. 173–5°. *β-Phenylesculetin*, yellowish cryst. powder, sol. with orange-yellow color in alk., with yellow color in H_2SO_4, gives a green color with aq. $FeCl_3$. *Diacetate*, needles, m. 156°. *Dibenzoate*, needles, m. 162–4°. *Monomethyl ether*, needles, m. 122–4°. C. A. R.

Hydroxy-γ-pyrone and some of its Derivatives. A. PERATONER. Rome. *Gazz. chim. ital.*, 41, II, 619–85; cf. *Ibid.*, 36, I, 1.—Ost's compd. $C_{10}H_7O_7N$ (*J. prakt. Chem.*, 19, 195), obtained from pyromeconic acid and N_2O_3, which P. has already shown to be an addition product of the acid with its isonitroso deriv. (I), with $PhNHNH_2$ gives

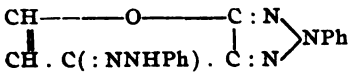


(I)



(II)

2 apparently stereomeric *diphenylhydrazopyromeconic acid oximes* (II), slender, felted needles, m. 165°, sol. in C_6H_6, and short needles, sometimes scales, m. 199–200°, insol. in C_6H_6. Both are oxidized by alc. $FeCl_3$ to the same *osotetrazone*, slender needles, deep red in transmitted, black with green metallic luster in incident light, m. 137–8°. When heated some time above their m. p., the 2 hydrazones lose 1 mol. H_2O and give the same *triazole derivative* (III), needles, m. 242°. With *o*-$C_6H_4(NH_2)_2$ the isonitroso



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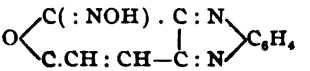
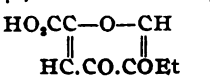


(IV)

deriv. gives a *quinoxaline* (IV), slender, lemon-yellow crystals, sublimes, sol. in H_2SO_4 with green color and in dil. alk. without change. The diacetate of *α,β*-dihydroxy-*γ*-pyridone (Ost's pyromecazonic acid) gives, with diazomethane, about equal amts. of O- and N-ethers, as is characteristic of *γ*- in contradistinction to *α*-pyridones; the "pyromecazone" or corresponding quinone behaves similarly towards CH_2N_2 but with $MeCHN_2$, practically only O-ether is obtained. That the compd. is an *o*-quinone is shown by the Bamberger color reaction (*Ber.*, 18, 865. 1932), and the formation of a *quinoxaline*, canary-yellow felted needles, which forms an *acetyl derivative*, yellow needles. *N-α,β*-Trihydroxypyridone. (Ost's hydroxypyromecazonic acid), cautiously treated with $FeCl_3$, gives a red *iron salt*, $Fe(C_5H_4O_4N)_2.3H_2O$, in the formation of which only 1 OH (that attached to N) takes part; it also forms a *triacetate*, minute needles, m. 123–4°, and a *tribenzoate*, needles, m. 162–3°. With ethylcomenic acid (V) NH_2OH



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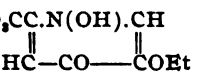

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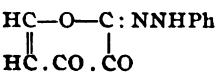

(VII)

reacts like NH_3, forming an *N-hydroxypyridone* (VI), m. 174–5°; it gives a reddish brown color with $FeCl_3$. *Ethyl ester*, fine needles, m. 156°; its aq. soln. is neutral to litmus but gives with $FeCl_3$ the same color as the acid. *Ethyl ester acetate*, needles in rosets, m. 82–3°, gives no color with $FeCl_3$. The above ester is similarly obtained from Et ethylcomenate and NH_2OH. The ester is easily hydrolyzed to the acid (VI) by simple crystn. from aq. Me_2CO. Sn and HCl reduce this acid to *β-ethoxy-γ-pyridone-*

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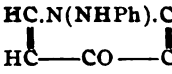
α'-carboxylic acid, $C_6H_9O_4N.H_2O$, m. 224–5° and (after dehydration at 150°) m. 235°, identical with the product obtained from NH_2 and ethylcomenic acid. B. HI (d. 1.76) hydrolyzes the ethoxy compd. to the corresponding hydroxy deriv. (Ost's comenammic acid). With diazonium salts, pyromeconic acid, like other $—CH_2C(:O)—$ compds., forms hydrazones; thus, with PhN_2OAc, it gives the *hydrazone* (VII), brick-red rosets from xylene, purple scales from alc., decomp. 176°; when it is treated in AcOH with $PhNHNH_2$ and fractionally pptd. with H_2O, 2 stereomeric *trihydrazones* are obtained, m. 161–2° and 212–4°, resp. Both suffer profound alteration when heated with alc. HCl; the lower m. is transformed into the higher m. form when warmed in alc. in a slow current of HCl. With *o*-$C_6H_4(NH_2)_2$, the monohydrazone gives a *quinoxaline*, m. about 245°; while with SO_2 it is converted into the *pyridone derivative* (VIII), scales, m. 220°. Heated with fuming HCl, it does not lose the PhNHNH-



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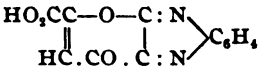

(IX)

residue but forms a *hydrochloride*, needles, dissociating into its components when heated. It is not reduced by Sn and HCl. It forms a *diacetate*, scales, m. 155–6°; a *quinone* with $FeCl_3$, recognized through the formation of a *quinoxaline*, golden yellow scales, m. 181–2° and sublimes. The quinone can be isolated in the form of its MeOH addition product by using Ag_2O as the oxidizer. The compd. $C_6H_2O_3Br_2$, obtained by Mennel from comenic or meconic acid and Br (*J. prakt. Chem.*, 26, 465), is easily and quant. converted by *o*-$C_6H_4(NH_2)_2$ into HBr and a *quinoxaline*, decomp. above 200°, which must have the formula (IX). With $PhNHNH_2$ this gives a *hydrazone*, voluminous, light yellow flocks, decomp. about 170°. These facts and all the properties of the dibromo compd. confirm the ketobromide structure, $—CBr_2C(:O)—$ previously assigned to it by P. and give strong evidence in favor of the ketomethylene structure, $—CH_2C(:O)—$, of comenic acid. Likewise, the properties of the compds. described above confirm the structures assigned by P. to Ost's products; the transformation of the pyrone deriv. (I) into a pyridone deriv. may be explained as due to a splitting off of NH_2OH and the reaction of the latter on the resulting triketo compd., the ring O being replaced by an N.OH group. CHAS. A. ROUILLER.

Synthesis of Pyromeconic Acid. A. PERATONER. Rome. *Gazz. chim. ital.*, 41, II, 686–97; cf. *Ibid.*, 50, I, 562.—*Ethyl oxaloethoxyacetone*, $EtOCH_2COCH_2COCO_2Et$, from $EtOCH_2COCH_2OEt$, $(CO_2Et)_2$, Na and abs. alc., slightly yellow oil, b_{20} 135–40°, gives with aq. $FeCl_3$ the characteristic color reaction of 1,3-diketones, and with $Cu(OAc)_2$ a green *copper salt*, $C_{18}H_{26}O_{10}Cu$. When the Na salt is heated with Na and $(CO_2Et)_2$ in alc. (finally at 140–5°), it forms *diethyl dioxaloethoxyacetone*, $EtO_2CCOCH(OEt)COCH_2COCO_2Et$, needles or scales, m. 124–5°, exceedingly sol., purified by sublimation (20 mm.), immediately gives a yellow color with bases, a dirty green with $FeCl_3$. All attempts to get an anhydride were, however, unsuccessful (heating with conc. HCl to dryness, under a return condenser or in sealed tubes to 130°, produced practically no change; above 150°, there is complete decomp.); HI (d. 1.7) converts it into pimelic acid. γ-Pyrone, treated in H_2SO_4 with H_2O_2 and $FeSO_4$, gives a small amt. (5%) of pyromeconic acid. CHAS. A. ROUILLER.

Action of Phosphoric Pentachloride on Hydroxyazo Compounds. G. CHARRIER AND G. FERRERI. Ist. chim. r. univ. Torino. *Gazz. chim. ital.*, 41, II, 717–29.—*o-Anisoleazo-β-naphthol*, $MeOC_6H_4N_2C_{10}H_6OH$, from $MeOC_6H_4N_2Cl$ and β-$C_{10}H_7OH$ in alk. soln., yellowish red needles with golden luster, m. 178°, sol. in conc. H_2SO_4 with reddish violet color. With 1 mol. PCl_5 and subsequent decomp. of the product with H_2O it gives MeCl and *o-hydroxybenzeneazo-β-naphthol*, cantharides-green tables, m.

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193°. *o-Phenetoleazo-β-naphthol*, minute. orange-red leaves with golden luster, m. 138°, gives the same hydroxy compd. above with PCl_5. This latter, which can be made directly from $HOC_6H_4N_2Cl$ and $C_{10}H_7OH$, appears in 3 forms: green tables from EtOH or AcOEt; minute red needles, without luster and becoming electrified when powdered, from C_6H_6 or PhMe; and red needles with golden luster from MeOH. The last 2 are transformed into the 1st in contact with EtOH or when heated to 120–30°. Only the H of the benzene OH is reactive. *Sodium salt*, $HOC_{10}H_6N_2C_6H_4ONa.3H_2O$, minute, emerald-green scales, sol. in cold H_2O with intense violet color, hydrolyzed in hot H_2O; in excess of alk. the solns. are red and stable towards heat. *Potassium salt*, emerald-green scales with 1.5 H_2O. *Acetate*, ruby-red needles, m. 153°. *Benzoate*, orange-yellow needles, m. 216°. *Benzyl ether*, red needles, m. 152–3°. *p-Anisoleazo-β-naphthol*, red needles, m. 137°; when treated with PCl_5, the chief product is *1-p-anisoleazo-2-chloronaphthalene*, $MeOC_6H_4N_2C_{10}H_6Cl$, orange-red prisms or yellowish red scales, m. 87°. Zn dust and AcOH reduce it to 2-chloro-1-naphthylamine which yields, successively, an *acetyl derivative*, needles, m. 191°, and a *diacetyl derivative*, prisms, m. 88°. With HNO_2 and β-$C_{10}H_7NH_2$, the above amine forms *2-chloronaphthaleneazo-β-naphthylamine*, garnet-red needles, m. 125°. With $C_{10}H_7OH$ is obtained *2-chloronaphthyl azo-β-naphthol*, deep red needles with golden luster, m. 177°. *p-Phenetoleazo-β-naphthol*, red needles, m. 132°. With PCl_5 it forms *1-p-phenetoleazo-2-chloronaphthalene*, orange-yellow leaflets, m. 94°. CHAS. A. ROUILLER.

Mercuric Urethans and Acetate. A. PIERONI. Ist. chim. farm., univ. Bologna. *Gazz. chim. ital.*, 41, II, 754–6.—In accordance with the increasing negative character of homologous urethans with increasing mol. wt., the Hg compds. of the higher urethans are the most stable, those with the lower derivs. the most basic. Thus, H_2NCO_2Me and $Hg(OAc)_2$ in alc. with a slight excess of alk., gives *mercurymethylurethan hydroxide*, $MeO_2CNHHgOH$, slightly yellow, friable, transparent scales, decomp. without m., sol. in NaI, the soln. becoming strongly caustic. Dissolved with $Hg(OAc)_2$ in H_2O at 60°, it forms the *acetate*, microscopic needles, decomp. quant. by KI into H_2NCO_2Me, HgI_2, AcOK and KOH. Under the same conditions, H_2NCO_2Et gives *mercury ethylurethan*, $HgNCO_2Et.H_2O$, microscopic needles. In the same way is obtained *mercuryisoamylurethan*, m. about 165° (decomp.). C. A. R.

***N*-Aminonaphthalimide and Derivatives.** A. OSTROGOVICH AND M. MIHAILESCU. Ist. chim., univ. Bucarest. *Gazz. chim. ital.*, 41, II, 757–807.—*N-Aminonaphthalimide*, $C_{10}H_6(CO)_2NNH_2$, lemon-yellow needles, m. 262°, is obtained by b. $C_{10}H_6(CO)_2O$ in glacial AcOH for a few min. with $N_2H_4.H_2SO_4$ and NaOAc in H_2O, by heating the imide with the same reagents several hrs. at 200–20°, or by b. the acid in 10% KOH with the $N_2H_4.H_2SO_4$ for a short time. It is neutral to indicators, sublimes unchanged and is not attacked by even conc. acids or alk. on b. It dissolves in conc. H_2SO_4 with yellowish color and turquoise fluorescence, and a little H_2O ppts. the *sulfate*, tabular crystals which, however, are stable only in H_2SO_4 of a certain conc.; the least trace of H_2O hydrolyzes it, turning it yellow. *Hydrochloride*. *Chloroplatinate*, $(C_{12}H_8O_2N_2)_2$-H_2PtCl_6, orange-yellow, cryst. powder. *Picrate*, orange-yellow needles, m. 192°. HNO_2 converts the amine into $C_{10}H_6(CO)_2NH$, with evolution of N_2O; NaOBr likewise, with liberation of N. Anhydrides of monobasic acids convert it into the corresponding acyl derivs. *Formyl-N-aminonaphthalimide*, $C_{10}H_6(CO)_2NNHCHO$ (this was prepared by heating the amine with $HCONH_2$ at 140°), prisms, m. 245–6°; very stable, can be cryst. from b. H_2O, EtOH or Et_2O; sol. without color and faint violet fluorescence in conc. H_2SO_4; hot conc. and b. dil. H_2SO_4 hydrolyze it, likewise b. alk., but cold alk., conc. or dil., dissolve it without change. *Acetyl-N-aminonaphthalimide*, needles, m. 260–1°. *Benzoyl derivative*, needles, softens 280°, m. 290–1°, hydrolyzed by hot conc. H_2SO_4 but not by alk. Anhydrides of aryl dibasic acids form, with the

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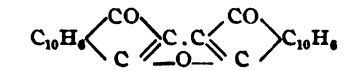
amine, the corresponding imide with elimination of H_2O, but those of acyclic acids first form an addition product or ammic acid. *β-Naphthalimylsuccinammic acid*, $C_{10}H_6(CO)_2NNHCOCH_2CH_2CO_2H$ (the radical $C_{10}H_6(CO)_2N$— is designated as *naphthalimyl*), acicular crystals, m. 213° (loss of H_2O), solidifies and m. again 265–70°, sol. with effervescence, even in the cold, in alk. carbonates and bicarbonates; AcOH and dil. HCl reppt. it from these solns. but not CO_2. When b. with glacial AcOH or heated at 180° in dry air, it forms the *imide*, cryst. powder, contracts about 260°, m. 272–3°; dil. alk. change it back into the ammic acid. *N-Naphthalimylmaleinammic acid*, microcryst., m. 205° (decomp.), not pptd. from alk. soln. by AcOH; it does not absorb Br and therefore probably has the *cis* form. B. AcCl in large excess converts it into the *imide*, minute needles, m. 118–20°, solidifies and m. again 215°. This is probably due to the fact that the original imide has the unsym. form and on heating passes into the sym. form. It gives the Piutti reaction for unsatd. substituted imides (*Gazz. chim. ital.*, 36, II, 364). *N-Naphthalimylcitraconammic acid*, prisms. *Imide*, softens 250°, m. 254–5°; it can be obtained directly without passing through the ammic acid. *N-Naphthalimylphthalimide*, scales, m. 320°. *N-Naphthalimylnaphthalimide*, cryst. powder, m. about 330°. Aldehydes in general condense directly with the $C_{10}H_6(CO)_2NNH_2$ with elimination of H_2O and formation of a Schiff base, but with aromatic aldehydes containing a free *p*-OH group, an intermediate addition product is obtained. *Ethylidene-N-aminonaphthalimide*, $C_{10}H_6(CO)_2NN : CHMe$, needles, m. 172°, easily hydrolyzed by acids and alk. *Benzylidene derivative*, needles, m. 206–7°; stable towards alk. and HCl but hydrolyzed by H_2SO_4. *Cinnamylidene derivative*, needles, m. 195–6°. *o-Hydroxybenzylidene derivative*, needles, m. 230–1°. With *p*-HOC_6H_4CHO is obtained an *addition compound*, $C_{12}H_8O_2N_2.C_7H_6O_2$, needles, which, when b. some time with glacial AcOH, gives *p-hydroxybenzylidene-N-aminonaphthalimide*, prisms, soften 270°, m. 283–4° (decomp.). *p-Methoxybenzylidene derivative*, needles, contracts 210°, m. 216–7°. *2,4-Benzylidene derivative*, yellowish prisms, redden about 180°, then turn purple and finally almost black and m. 289–90°. In its prep. the *addition compound*, containing 1 H_2O more, is formed in about equal amt. and is converted into the imide by b. with glacial AcOH. *3,4-Dihydroxybenzylidene derivative*, light yellow prisms, turn brown about 260°, black at 280° without m., obtained through the *addition product*, microcryst. powder. *3-Methoxy-4-hydroxybenzylidene derivative*, prismatic needles, soften 228°, m. 231–2°, obtained through the *addition compound*, yellowish needles. *3,4-Dimethoxybenzylidene derivative*, needles, m. 229–30°. *Piperonylidene derivative*, needles, m. 256–7°. *N-Naphthalimyl-p-benzoquinoneimine*, $C_{10}H_6(CO)_2NN : C_6H_4 : O$, infusible, brownish orange, microcryst. ppt., sol. with orange to red color in alk. and repptd. unchanged by acids, sol. in conc. H_2SO_4 with red, slightly violet color, unaffected by conc. HCl. C. A. R.

Hydroxyketo-*peri*-naphthindene (*peri*-**Naphthindandione**). II. G. Errera and A. Cuffaro. Ist. chim. r. univ. Palermo. *Gazz. chim. ital.*, 41, II, 807–14; cf. *C. A.*, 5, 2637.—As the free substance and all of its derivs. behave like ketoenols, the first of the above names is preferable to the 2nd, originally assigned to it. When oxidized with $K_2Cr_2O_7$ (1 at. O) in AcOH, it forms *anhydrobishydroxyketo-peri-naphthindene* (I), brownish yellow needles, blackens 360°, m. higher (decomp.), insol. in bases. With



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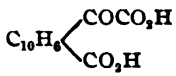

(II)

5% alk. $KMnO_4$, on the other hand, is obtained naphthalic acid and *naphthalonic acid* (II), minute needles, m. about 225° (decomp.), forming *naphthaldehydic acid anhydride* (III), prisms, m. 310–3° (decomp.) when heated rapidly. It is doubtless identical

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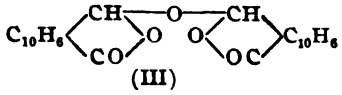
with the product obtained by Graebe and Gfeller by heating naphthaldehydic acid (*Ann.*, 276, 14). When the hydroxyketo compd. is b. with BzH in alc. and 2 drops



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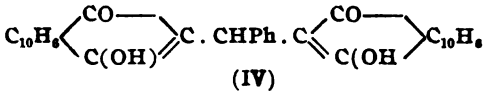
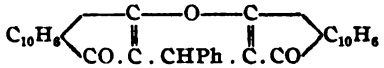


(IV)

pyridine, it gives *dihydroxyketo-peri-naphthindenylphenylmethane* (IV), strawberry-red rosets from xylene, golden yellow cryst. powder from alc., m. 295–7° (decomp.). It dissolves in alk. after long b., but acids ppt. the hydroxyketonaphthindene from the solns. By using alc. NaOH, the *sodium salt*, $C_{23}H_{19}O_4Na$, $K_2Cr_2O_7$-like crystals, is obtained; very slightly sol. in alc. or H_2O, but sol. in alc. NaOH. The compd. (IV),

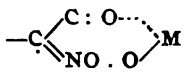


(V)

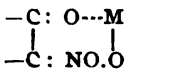
treated with 10% alc. H_2SO_4, loses H_2O and forms *phenyldiketo-peri-naphthindene-xanthene* (V), yellow needles, m. above 365° (decomp.), does not form salts.

CHAS. A. ROUILLER.

Conjugated Acinitro Compounds. A. HANTZSCH AND KURT VOIGT. *Ber.*, 45, 85–117.—Measurements have been made of the absorption of nitromethane, nitroethane, nitroacetaldoxime, nitroacetic acid, dinitromethane, nitroform, nitromalonic ester, phenylnitromethane, phenylcyanonitromethane, nitrocyanoacetamide (fulminuric acid) and nitrobarbituric acid, their salts and, when possible, their esters. The following conclusions are drawn: The NO_2 group exists in 3 forms: (1) the aliphatic, true nitro compds. containing NO_2; these exhibit very feeble selective absorption. (2) Simple acinitro compds. containing the group RCH : NOOM (M = metal). These occur only as salts of the mononitroparaffins and exhibit very feeble general absorption. (3) "Conjugated acinitro compds.," containing a group such as formula (I) below,



(I)



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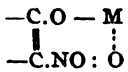

(III)

(M = metal, H or alkyl). They exhibit very strong selective absorption and exist as salts, esters, or in the free state (fulminuric and nitrobarbituric acids). They contain Ph, or strongly negative, aliphatic groups and their peculiar properties are supposed to be produced by the effect of the subsiduary valence (dotted line in I). Certain conjugated acinitro compds. exhibit chromoisomerism, for example the colorless and yellow salts of the nitrobarbituric acids. These were formerly supposed to be simple and conjugated acinitro salts, resp. They are now regarded as valence isomers (II) and (III) (M = metal). A change in the quality of the absorption shows that equil. exists between chromoisomeric (valence isomeric) acinitro compds.

J. BISHOP TINGLE.

Refutation of the Conclusions of C. Bülow Regarding the Pyrazolinecarboxylic Acids. EDUARD BUCHNER. Univ. Würzburg. *Ber.*, 45, 117–21; cf. *C. A.*, 6, 864. —Bülow's conclusions are considered to be invalid because he has ignored the following facts: (1) Analogy with the interaction of diazoacetic esters with esters containing acetylene linkages. (2) The ease with which oxidizing agents convert the condensation products into pyrazole derivs. (3) The difference in stability between the pyrazoline and pyrazole derivs. (4) The mode of formation of 4-phenylpyrazolidinedicarboxylic acid from 4-phenylpyrazoline-3,5-dicarboxylic ester and the relative stability of the former towards $KMnO_4$.

J. BISHOP TINGLE.

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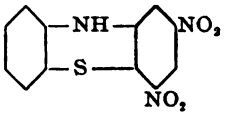
Thiazines. RICHARD MÖHLAU, H. BEYSCHLAG AND H. KÖHRES. Dresden. *Ber.*, 45, 131–7.—1,3-Dinitrophenthiazine (Kehrmann and Steinberg, *C. A.*, 6, 363) m. 187°. Dibenzoyl-*o*-diaminodiphenyl disulfide, $BzNHC_6H_4S_2C_6H_4NHBz$, from *o*-diaminodiphenyl disulfide and BzCl; needles, m. 141°. Yield, 86%. *[Benzoyl-o-aminophenyl]-picryl sulfide*, $BzNHC_6H_4SC_6H_2(NO_2)_3$, from the preceding compd. and picryl chloride; yellow prisms, m. 169°. Yield, 73.6%. With b., aq.-alc. NaOH it gives *2,4-dinitrophenthiazine*, (I); almost black prisms, m. 218°. Yield, 62.6%. $SnCl_2$+



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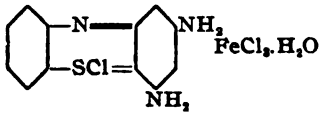
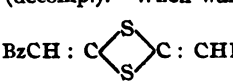


(II)

HCl reduces it to *2,4-diaminophenthiazine stannic chloride*, $(C_{12}H_{11}N_3S.2HCl)_4.SnCl_4$; brownish yellow needles. Yield, 89.3%. With $FeCl_3$ it gives *2,4-diaminophenazthionium chloride ferric chloride* (II); greenish black crystals. Yield, 84.2%. *Chloroplatinate* and *chromate*, brownish black. *Carbonate*, dark brown and flocculent.

J. BISHOP TINGLE.

Constitution of Desaurins. C. KELBER AND A. SCHWARZ. Univ. Erlangen. *Ber.*, 45, 137–47.—The *desaurin*, (I), is formed from phenyl-[β,β-dimercaptovinyl] ketone, at 100°, from the ketone Pb salt, or di-Bz deriv. in b. BzOEt. The ketone and $HgCl_2$ give a *mercury mercaptide*; $C_{18}H_{14}O_2S_4Hg$; orange needles, darkens 130–40°, m. 185–90° (decomp.). In b. xylene it decomp. into H_2S, HgS and (I). *Phenyl-[β,β-dimercaptovinyl]-thiourethan*, $C_{16}H_{12}O_2NS_2$, from the ketone and PhNCO; needles, m. 94° (decomp.). When warmed it gives (I). The desaurin (I) from acetophenone



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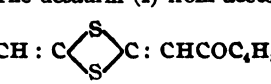
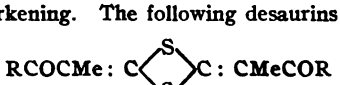


(II)

forms yellow prisms from ethylene bromide, m. 212–4° (decomp.). The desaurin. (II), from methyl α-thienyl ketone as with (I); yellow needles from BzOEt, decomp. above 260°, previously darkening. The following desaurins (III) were prepared from



(III)

the ketones mentioned, KOH and CS_2. *Desaurin* (R = Ph) from BzEt; golden yellow plates, m. 225°. Desaurin (R = MeC_6H_4) from tolyl (?) ethyl ketone; yellow needles, m. 263–5°. *Desaurin* (R = C_4H_3S) from α-thienyl ethyl ketone; yellow needles, m. 258–60°. *Desaurin* (R = β–$C_{10}H_7$), from β-naphthyl ethyl ketone; yellow plates, m. 264°, decomp. 268–9°.

J. BISHOP TINGLE.

Red Color Produced by Ferric Chloride and Pyrocatechol in Alkaline Solution. I. R. F. WEINLAND AND KARL BINDER. Univ. Tübingen. *Ber.*, 45, 148–54.—Contrary to statements in the literature, pyrocatechol and $FeCl_3$ give a deep red color with alkali hydroxides, Na_2CO_3, NH_3, or $NaHCO_3$. With AcONa the color is violet. The red color is due to the presence of one of the following salts which are best prepd. from $Fe(OAc)_3$. *Potassium salt*, $K_3Fe(C_6H_4O_2)_3.2H_2O$, from $Fe(OAc)_3$, or from $FeSO_4$; brownish black, of bronze-red, cryst. powder. *Ammonium salt*, $(NH_4)_3Fe(C_6H_4O_2)_3.H_2O$, brownish black powder, or violet-red needles. *Sodium salt*, $Na_3Fe(C_6H_4O_2)_3.10H_2O$, brownish black, hexagonal rods. *Calcium*, *barium*, *magnesium* and *lead salts*.

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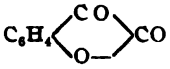
Coumarandione, the Oxygen Isolog of Isatin. K. FRIES AND W. PFAFFENDORF. Univ. Marburg. *Ber.*, 45, 154–62; cf. *C. A.*, 4, 1046.—Coumarandione (I), from



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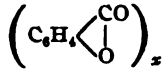
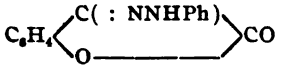


(II)

o-hydroxybenzoylformic acid, P_4O_{10} and b. benzine, or b. the acid (20 min.). At about 220° it decomp. into CO and polymeric *salicylide*, (II); red and amorphous, softens about 150°. B., alc. alkali hydrolyzes it to salicylic acid. *Ethyl o-hydroxybenzoylformate*, $HOC_6H_4COCO_2Et$, from (I) and abs. alc.; m. 15°. When b. (15 mm.) it regenerates (I). *Coumarandione-3-phenylhydrazone* (III) from (I) and PhN_2H_3;



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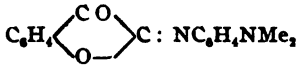
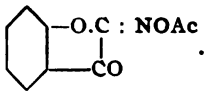


(IV)

yellow crystals, m. 185°. Alc. alkali hydrolyzes it to *o-hydroxybenzoylformic acid phenylhydrazone*, $HOC_6H_4C(:NNHPh)CO_2H$, which is also formed directly from the acid; pale yellow needles, m. 148° (decomp.). With HCl + AcOH it regenerates (III). *o-Hydroxybenzoylaniloformic acid*, $HOC_6H_4C(:NPh)CO_2H$, from (I) and $PhNH_2$; pale yellow plates, m. 102°. It could not be converted into a deriv. of (I). *o-Hydroxybenzoyl-[p-dimethylaminoanilo]-formic acid*, $HOC_6H_4C(:NC_6H_4NMe_2)CO_2H$, from (I) and *p*-aminodimethylaniline; deep red needles, m. 153°. It could not be converted into an anhydride. With PhN_2H_3 it gives *o*-hydroxybenzoylformic acid phenylhydrazone, and with *o*-phenylenediamine the quinoxaline deriv. of the acid. *Monosodium salt* and *monohydrochloride*, yellow. *Benzoyl o-hydroxybenzoylform[p-dimethylaminoanilide]*, $BzOC_6H_4COCONHC_6H_4NMe_2$, from coumarandion-2-[*p*-dimethylaminoanil] (IV) and aq. NaOH, followed by BzCl; red prisms, m. 138°. With alc. KOH it regenerates (IV). 3,5-Dibromo-2-hydroxybenzoylformic acid from (I), Br and glacial AcOH; decomp. 148° not 142°. *Monohydrate*, pale yellow needles, m. about 100°. *2-Bromocoumaranone* from coumaranone, Br and CCl_4; prisms, m. 87°. Some *2,2'-dibromocoumaranone* is formed simultaneously and is the only product if more Br is used; pale yellow needles, m. 142°. With dil., aq. NaOH it gives NaBr, (I) and *o*-hydroxybenzoylformic acid. Coumarophenazine is formed from the dibromo compd. and *o*-phenylenediamine. *2,2'-Dichlorocoumaranone* from coumaranone, glacial AcOH and Cl; prismatic crystals, m. 70°. With *o*-phenylenediamine it gives coumarophenazine. Cf. following abstr. J. BISHOP TINGLE.

Correction of the Paper "Analog of Isatin in the Coumarone Series, Coumarandione." R. STOERMER. Univ. Rostock. *Ber.*, 45, 162–3.—"Hydroxybenzoylformic lactone hydrate" (m. 178°) (Stoermer, *C. A.*, 3, 899) is really *acetyloximinocumaranone*,



Cf. preceding abstr. J. BISHOP TINGLE.

Final Reply to Holleman Concerning Priority. JUL. OBERMILLER. Basel. *Ber.*, 45, 165–7.—Reply to H. (*C. A.*, 6, 755) and a restatement of O.'s views on the mechanism of substitution in the C_6H_6 nucleus. J. BISHOP TINGLE.

Oxidation of Humic Acid. A. G. DOJARENKO. *7th Intern. Congr. Appl. Chem.*, 1909 (*Sect. VII*), 11–8; *J. Chem. Soc.*, 100, I, 357. J. J. M.

Catalytic Elimination of Hydrogen from Aromatic Nuclei and the Production of

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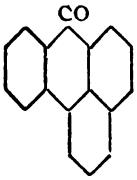
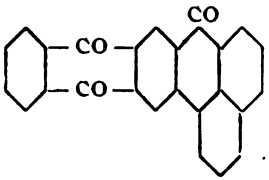
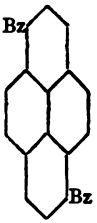
Condensed Systems by Aluminium Chloride. ROLAND SCHOLL AND CHRISTIAN SEER. Univ. Graz. *Monatsh.*, 33, 1–8.—The following compds. are formed by heating the resp. ketones with $AlCl_3$, at 80–140°. α-Naphthyl phenyl ketone gives benzanthrone (I).



(I)



(II)



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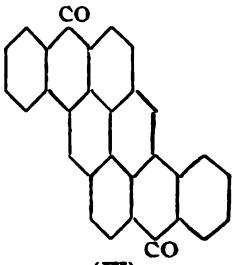
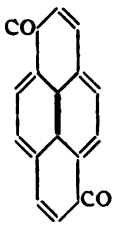


(IV)

2-Anthraquinonyl α-naphthyl ketone gives 6,7-phthaloylbenzanthrone (II). Dibenzoylpyrene (III), gives pyranthrone (IV). This result renders it probable that



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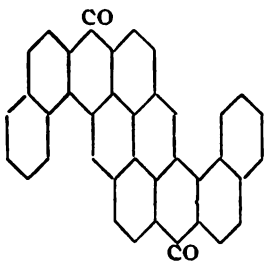
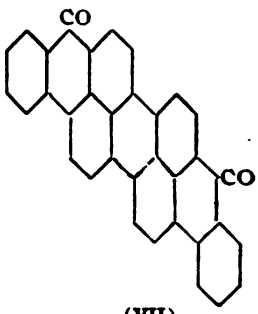
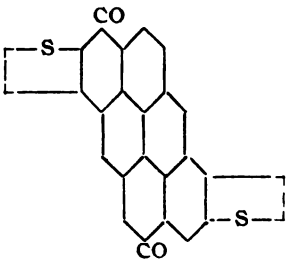


(VI)



(VII)

Bamberger and Philip's "3,10-diketopyrene" (*Ann.*, 240, 147 (1887)) is really 3,8-diketopyrene (V). Di-α- or di-β-naphthoylpyrene gives dibenzpyranthrone (VI).



(VIII)

4,4′-Dibenzoyl-1,1′-binaphthyl gives violanthrone (VII). 3,8-Di-α-thenoylpyrene gives (VIII). Benzil gives phenanthrenequinone. J. BISHOP TINGLE.

Methylation Experiments with Brucine. GUSTAV MOSSLER. *Monatsh.*, 33, 19–32.—*Methylbrucine acetate*, $C_{24}H_{30}O_5N_2.AcOH.5H_2O$, from brucine methiodide and AcOAg; plates, m. when anhydrous 208–9°, previously darkening; in H_2O, $[\alpha]_D^{20}$ —9.97° (anhydrous salt). It is also formed from methylbrucine and AcOH. With HCl it gives *brucine methochloride*, $C_{24}H_{30}O_4N_2Cl.3H_2O$; crystals, m. 259–60° (decomp.). Brucine methiodide is pptd. from aq. KI and methylbrucine or its acetate. *Dimethylbrucine iodide*, $C_{25}H_{33}O_5N_2I.2.5H_2O$, from methylbrucine, or its acetate, MeI and MeOH.

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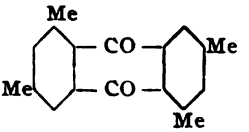
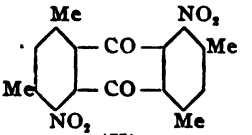
plates, m. about 368° (decomp.). *Acetate*, $C_{27}H_{26}O_7N_2.5H_2O$, crystals, m. 205–6° (decomp.); in H_2O, $[\alpha]_D^{20}$ —7.14° (anhydrous salt). With HCl it gives the *dihydrochloride*, $C_{25}H_{24}O_5N_2Cl_2.3H_2O$; crystals, m. 261° (decomp.). Dimethylbrucine iodide, $C_{25}H_{28}O_5N_2I$, from KI, or MeI and the acetate. J. BISHOP TINGLE.

Formation of Alkylated Anthraquinones from Alkylated Benzoyl Chlorides and Aluminium Chloride. II. CHR. SEER. *Monatsh.*, 33, 33–44; cf. *C. A.*, 5, 1919.—1,3,5,7-Tetramethylanthraquinone (I), from 3,5-dimethylbenzoyl chloride and $AlCl_3$ or by b. 3,5,2′,4′,6′-pentamethylbenzophenone; yellow needles, m. 235°. It gives the color reactions of anthraquinone compds. but is not reduced by alkaline agents. Yield, 3% of the ketone. *1,3,5,7-Tetramethylanthracene*, by distilling (I) with Zn dust; pale yellow plates, m. 163–4°. Yield, 10–5%. *Picrate*, cryst. m. 189–90°. *Anthraquinone-1,3,5,7-tetracarboxylic acid*, from (I) and HNO_3; amorphous, m. above 300.



(I)



(II)

4,8-Dinitro-1,3,5,7-tetramethylanthraquinone (II), from (I), conc. H_2SO_4 and KNO_3; grayish brown needles, m. 296°. With excess of KNO_3, as above, (I) gives *2,4,6,8-tetranitro-1,3,5,7-tetramethylanthraquinone*; yellow plates. Friedel and Crafts' tetramethylanthracene is a mixt. of the 1,3,5,7- and 1,3,6,8-isomers. J. B. TINGLE.

Effect of Molecular Symmetry on the Optical Activity and the Relative Rotation of Aromatic Position Isomers. T. P. HILDITCH. Univ. Coll., London. *Z. physik. Chem.*, 77, 482–97; cf. *C. A.*, 3, 425.—*Sodium camphor-β-thiosulfonate*, $C_{10}H_{16}OSO_2SNa$, from camphor-β-sulfonyl chloride and Na_2S; cryst. flocks. *Silver salt*, cream-colored powder. *Acid*, oily and unstable. *Anhydride*, $(C_{10}H_{16}OSO_2)_2S$, best from the Na salt and camphor-β-sulfonyl chloride, in CCl_4; pale yellow needles, m. 144°. *Dicamphor-β-sulfonyl disulfide*, $(C_{10}H_{15}OSO_2)_2S_2$, from the Na salt and I, or S_2Cl_2; needles, m. 130°. *Pyrocatechyl dicamphor-β-sulfonate*, $C_6H_4(SO_2C_{10}H_{15}O)_2$, red crystals, m. 124°. Resorcinyl dicamphor-β-sulfonate, pale yellow needles, m. 129–30°. *Hydroquinyl dicamphor-β-sulfonate*, prisms, m. 187° (decomp.). *Pyrogallyl tricamphor-β-sulfonate*, $C_6H_3(SO_2C_{10}H_{15}O_2)_3$, needles, softens 140°, m. 148° (decomp.). *Phloroglucinyl tricamphor-β-sulfonate*, prisms, m. 104–6°. The above phenol esters were prepared from camphor-β-sulfonyl chloride. At 22°, in $CHCl_3$, they have the following constants: α_D 1.014,* 1.068, 1.062, 1.250, 0.690 and 1.441, resp.; $[\alpha]_D$ 40.56,* 42.72, 42.48, 50.00, 27.60, 57.64; $[M]_D$ 124.9,*, 229.8, 228.6, 269.0, 212.0, 442.5; $[D]_D$ 12.3,* 2.3, 1.7, 21.9, —41.9, 34.9. The values marked * refer to phenyl camphor-β-sulfonate. These results and many others which are quoted from the literature lead to the following conclusions: Mol. symmetry without conjugated unsaturation causes hardly any optical effect. An unsaturated group exerts an effect in the same direction as that of 2 conjugated groups; symmetry in a part of the mol. exerts an effect on the whole. Sym. conjugation may not be the cause of optical effects, but it and the anomalies are parallel and simultaneous phenomena. The direction of the change in rotation caused by sym. conjugation varies; the rotation which originates in conjugation, or simple unsaturation, may be increased, neutralized, or reversed in sign. J. BISHOP TINGLE.

Existence of Molecularly Asymmetric Cinnamic Acid. E. ERLENMEYER AND G. HILGENDORF. Dahlem. *Biochem. Z.*, 35, 134–48.—Storax cinnamic acid was converted into the di-Br deriv. which was steam-distilled, giving β-phenyl-β-bromopro-

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pionic acid. It was sepd. into optical isomers by cinchonine and these were reconverted into cinnamic acids by Na-Hg, followed by HCl. In alc. the cinnamic acid from the *d*,β-phenyl-β-hydroxypropionic acid had a rotation of 0.5°. The *l*-isomer was inactive. Both were converted into Na phenoxyacrylates; that from the *d*-compd. was slightly *l*-rotatory, that from the (hypothetical) *l*-acid was feebly *d*-rotatory. The reduction products of *l*- and *d*,β-phenyl-β-bromopropionic acids exhibit only a slight decrease or even an increase in rotation as compared with the parent compds.

J. Bishop Tingle.

Synthesis of "Butin" [3,4',5'-Trihydroxyflavanone]. A. Göschke and J. Tambor. Univ. Berne. *Ber.*, 45, 186–8.—3,4-Dimethoxychalkone, $(HO)_2C_6H_3COCH : CHC_6H_3(OMe)_2$, from resacetophenone and veratrumic aldehyde; yellow prisms, m. 203°. *2',4',3'4-Tetramethoxychalkone*, from the aldehyde and resacetophenonyl dimethyl ether; needles, m. 89°. 3,4',5'-Trihydroxyflavanone has feebler dyeing powers for mordanted cotton than has 2',4',3,4-tetrahydroxychalkone. *3,'4,5'-Triacetoxyflavanone*, plates, m. 123°. *2',4',2-Trihydroxychalkone* from salicylic aldehyde and resacetophenone; orange needles with 1 H_2O, m. 185° (decomp.). J. Bishop Tingle.

Preparation and Reactions of Bis-α-hydrindone-(β,β)-spiran. Hermann Leuchs and Dan Radulescu. Univ. Berlin. *Ber.*, 45, 189–210.—*Dibenzylmalonic ester*, b. 234–5°. Yield, 84–7%. *Acid*, cryst. powder, m. 175°. Yield, about 60%, together with dibenzylacetic acid, 30%. *Dibenzylmalonic chloride*, needles, or prisms, m. 68–9°; b_{17} 216–8°; b_{22} 232–5°. Yield, 90%. *Dibenzylmalonamide*, needles, m. 198–9°. *Anilide*, needles, m. 196–7°. *Bis-(1)-hydrindone-(2,2)-spiran*

from the chloride alone (yield, 0.5–2%) or with $AlCl_3$; cryst. powder, m. 174°. Yield, (30%). *Bisphenylhydrazone*, sandy powder, m. 200–1° (gas evolution). With $HONH_2$ the spiran gives a *compound*, $C_{17}H_{13}O_2N$; plates, m. 214–5°. Aq. alc. NaOH converts the spiran into an *acid*, $C_{17}H_{14}O_3$; octahedral crystals, m. 140–2°; evolves gas about 220° and regenerates the spiran. *Sodium salt*, $C_{17}H_{13}O_2Na$, prisms. *Methyl ester*, oil. Abs. alc., NH_3 and the spiran give a *compound*, $C_{17}H_{13}ON$; plates, or cubes, m. 246–8° (darkens). A second *compound*, $C_{17}H_{15}O_2N$, is also formed; plates, m. 124–8° (gas evolution). It is converted into $C_{17}H_{13}ON$. *Anhydrobishydrindonespiran*, $C_{24}H_{22}O_2$, from dibenzylmalonyl chloride under ordinary pressure; pale red needles, m. 256–7°. It is also formed from the spiran, or the chloride and $AlCl_3$, or from the spiran and fused AcONa.

J. Bishop Tingle.

Strychnos Alkaloids. XIV. Derivatives and Degradation Products of Brucineolone and the Scission of Dihydrobrucineonic Acid into Isobrucineolone and Glycolic Acid. Hermann Leuchs and J. F. Brewster. Univ. Berlin. *Ber.*, 45, 201–21.—*Nitrobisapomethyldehydrobrucineolone*, $C_{19}H_{15}O_7N_3$, or $C_{19}H_{17}O_7N_3$, from brucineolone and HNO_3; orange-yellow plates. *Triacetylbisapomethylbrucineolone*, $C_{25}H_{24}O_8N_2$, hexagonal plates, m. 260–1°. *Brucineolone hydrate methyl ester* 1 *hydrochloride*, $C_{22}H_{27}O_6N_2Cl$, from brucineolone hydrate 1 hydrochloride, HCl and MeOH; tetragonal octahedra, m. 189–90° (gas evolution). Yield, 90% of the salt. It is also formed from brucineolone, MeOH and HCl, but the yield is smaller. *Brucineolone hydrate ethyl ester* 1 *hydrochloride*, $C_{23}H_{29}O_6N_2Cl$, tetragonal octahedra, m. 181° (gas evolution). *Brucine hydrate* 1 *phenyl isocyanate derivative*, $C_{33}H_{39}O_7N_3$, from the hydrate hydrochloride; amorphous powder, m. about 192° (gas evolution), previously softening. Yield, 80% of the hydrochloride. Brucineolone is formed from brucineolone hydrate hydrochloride 1, at 250°, or from brucineolone hydrate 1 at 135°, over P_4O_{10},

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in a vacuum. The compd., $C_{21}H_{24}O_6N_2$, from the brucineolone scission gives with HCl a *salt*, $C_{21}H_{24}O_6N_2.HCl.2H_2O$; plates or prisms, softens 230°; foams about 240°, m. 255°. *Base*, $C_{24}H_{24}O_6N_2.4H_2O$, prisms, softens 190°, m. about 240° (gas evolution). Brucineolone is formed from the compd., $C_{21}H_{24}O_6N_2$, and aq. NaOH. *Acetylbrucineolone*, $C_{23}H_{24}O_6N_2$, from brucineolone and Ac_2O; hexagonal prisms, m. 253–4°. With acetone and $KMnO_4$ it gives an *acid*, $C_{23}H_{24}O_9N_2$; prisms with 4 H_2O, softens 120°, m. about 160° (gas evolution), becomes solid, turns yellow 240°, m. 275°. At 160–80° the acid gives CO_2 and a *compound*, $C_{22}H_{24}O_7N_2$; rhombohedral crystals, m. and darkens about 281°. A *compound*, $C_{23}H_{22}O_6N_2$, is formed with the acid; pale yellow prisms, m. about 312°. Yield, 5.5% of the Ac deriv. B., aq. NaOH hydrolyzes dihydrobrucineonic acid to glycollic acid and *isobrucineolone*, $C_{21}H_{22}O_6N_2$; yellow plates, m. and darkens 308°; in glacial AcOH, $[\alpha]_D^{22}$ 26.5°. A similar scission of dihydrobrucineonic acid occurs at the ordinary temp. J. Bishop Tingle.

Hexachlorobenzenes and their Decomposition into Trichlorobenzenes. T. van der Linden. Org. Univ., Amsterdam. *Ber.*, 45, 231–47.—The oily material formed with α- and β-hexachlorobenzenes contains 2 other isomers, together with chloro- and dichlorobenzenes. *γ-Hexachlorobenzene*, needles, m. 112-3°; f. p. 112.7°. With alc. KOH it eliminates 3 mols. of HCl. *δ-Hexachlorobenzene*, plates, m. 129–32°. It contained a little β-compd. The γ- and δ-isomers are not changed by conc. HNO_3, or conc. H_2SO_4 at 100°. The f. ps. of mixtures of 1,2,4-trichlorobenzene with the 1,2,3- and 1,3,5-isomers have been detd. and also those of ternary mixtures of these compds. The elimination of HCl from α-hexachlorobenzene leads to the following conclusions: 1,2,4-, 1,2,3- and 1,3,5-trichlorobenzenes are formed in proportions which are not materially affected by the temp. employed, nor by the use of KOH, or NaOH in alc., or MeOH. The use of pyridine increases the proportion of 1,2,4-trichlorobenzene from about 76 to 86%, but that of the 1,3,5-isomer remains unchanged (about 7.5%). Quinoline behaves like pyridine. β-Hexachlorobenzene is relatively stable towards pyridine; with alc. KOH it gives the isomeric trichlorobenzenes 1,2,4- (86.4%), 1,2,3- (5.3%) and 1,3,5- (8.3%). γ-Hexachlorobenzene behaves like the β-compd. with alc. KOH, the % of the resp. trichlorobenzenes being 82.4, 4.7 and 12.9, at 80°, in both cases. δ-Hexachlorobenzene could not be obtained in quantity sufficient for investigation. No indication could be obtained of the formation of compds. intermediate between $C_6H_6Cl_6$ and $C_6H_2Cl_4$, by the interaction of the former with MeOH and NaOH. J. Bishop Tingle.

Optically Active Dialkylacetic Acids. Emil Fischer, Julius Holzapfel and Hans v. Gwinner. *Ber.*, 45, 247–57.—*Diethyl butylisobutylmalonate*, from Et isobutylmalonate, Na, alc. and BuBr; oil, b_{10} 137–40°. Yield, nearly 75% of the ester. *Acid*, from the ester and alc. NaOH; cryst. *Sodium*, *calcium* and *barium salts*, cryst. *Silver salt*. At 160° the acid gives butylisobutylacetic acid; oil, b_{10} 145–5.5° (cor.). *Silver*, *calcium* and *ammonium salts*. The acid was resolved by brucine, the salt of the *d-acid* being the less sol.; oil, $[\alpha]_D^{21.5}$ 5.73°. At 20° it had the following refractive powers in the solvents mentioned: xylene, 0.45° (±0.03); alc., 0.41°; 1 *N* aq. NaOH, 0.36° (±0.03). *Diethyl propylisobutylmalonate*, from isobutylmalonic ester and PrI; oil, $b_{9.5}$ 126° (cor.). Yield, 76%. *Acid*, prisms, or plates, m. about 145–7° (147–9° cor.). Yield, 70%. *Silver salt*, cryst. *Propylisobutylacetic acid*, oil, b_{12} 125–7°; d_{20} 0.8928. Yield, about 77% of the propylisobutylmalonic acid. *Silver* and *calcium salts*. Brucine re-solves the acid into its isomers, the *d*-salt being the less sol. *d-Acid*, oil $[\alpha]_D^{22}$ 9.9°; d_{22} 0.8876. *Propylisopropylmalonamidic acid*, $Pr^{\alpha}CPr^{\beta}(CONH_2)CO_2H$, from propylisopropylcyanoacetic acid and conc. H_2SO_4; prisms, m. about 137° (cor.) (gas evolution). Yield, 63%. When distilled the amidic acid gives *propylisopropylacetamide*; needles, m. 129–30° (131–3° cor.). With H_2SO_4 and $NaNO_2$ it forms *pro-*

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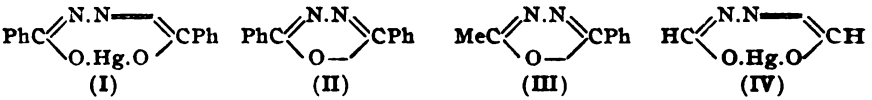
pylisopropylacetic acid; oil, b_{12} about 116° (cor.); b_9 112–3°; d_{17} 0.9076. Yield, 60%. With quinidine it gives a *salt* from which an *acid* having $[\alpha]_D^{22}$ 0.77° was obtained. J. Bishop Tingle.

Specific Refractive Power of Glutamine; Ammonium Glutamate. E. Schulze and G. Trier. Zurich. *Ber.*, 45, 257–62.—Glutamine usually exhibits a variable refractive power, but specimens of different origin, after purification with $Hg(NO_3)_2$ and conversion into the Cu compd., have $[\alpha]_D$ 6.0°. A higher value is probably caused by the presence of glutamic acid. With NH_3 it gives a *l*-rotatory monobasic salt, which evolves NH_3 over H_2SO_4. All the NH_3 is evolved when the salt is evapd. with H_2O. J. Bishop Tingle.

3,5-Dinitro-2-chlorotoluene. W. Borsche and A. Fiedler. Univ. Göttingen. *Ber.*, 45, 270–3.—Contrary to the statements of Nietzki and Rehe (*Ber.*, 25, 3005 (1892)) *o*-chlorotoluene, HNO_3 and H_2SO_4 give a mixture of nitration compds., including 3,5-dinitro-2-chlorotoluene, m. 63–4°, not 45°. 3,5-Dinitro-2-chlorotoluene is also formed in the same manner from 3-, or 5-nitro-2-chlorotoluene. These latter compds. are produced from acet-*o*-toluidide, HNO_3 and glacial AcOH. J. Bishop Tingle.

Preparation and Reactions of Azoacyl Compounds. R. Stollé. Univ. Heidelberg. *Ber.*, 45, 273–89.—*Mercury dibenzhydrazide* (I), from dibenzhydrazide, NaOEt,



(I) (II) (III) (IV)

$HgCl_2$ and alc.; pulverulent. With Br it gives *azodibenzoyl*, BzN : NBz. Yield, 90%. At 270°, in CO_2, it gives benzil and diphenylfurodiazole (II). BzH and azodibenzoyl form N, tribenzoylhydrazine and (II). *Di-p-chlorobenzoylhydrazine*, $ClC_6H_4CONHNHCOC_6H_4Cl$, from *p*-chlorobenzoyl chloride, $(N_2H_4)_2H_2SO_4$ and aq. NaOH; needles, m. 289°. *Sodium salt*, $ClC_6H_4C(ONa) : NNHCOC_6H_4Cl$, pale yellow plates. *Silver salt*, pale yellow powder. With I it gives *azodi-p-chlorobenzoyl*, $ClC_6H_4CON : NCOC_6H_4Cl$; yellow needles, m. 147° (darkens and evolves gas). With H_2S or $(NH_4)_2S$ it regenerates di-*p*-chlorobenzoylhydrazine. *Di-α-naphthoylhydrazine*, from α-naphthoyl chloride, as above; m. 260°. *Silver salt*, $C_{10}H_7C(OAg) : NNHCOC_{10}H_7$, pale yellow powder. With I it gives *azodi-α-naphthoyl*, $C_{10}H_7CON : NCOC_{10}H_7$; orange-red needles, m. 148°. With reducing agents it regenerates di-α-naphthoylhydrazine and at 140–50° decomp. into N and a *compound*, probably *di-α-naphthoyl*; yellow, m. 187°. With H_2O, azodi-α-naphthoyl gives α-naphthoic acid, di-α-naphthoylhydrazine and *tri-α-naphthoylhydrazine*, which is also formed from α-naphthoyl chloride and aq. di-α-naphthoylhydrazine; crystals, m. 188°. *Sodium acetylbenzoylhydrazine*, from acetylbenzoylhydrazine and EtONa; pulverulent. *Mercuric salt*, powder. With I it gives *acetylazobenzoyl*, AcN : NBz; red oil. With H_2O it gives N, dibenzhydrazide, BzOH and acetyldibenzoylhydrazine. *Methylphenylfurodiazole* (III), from acetylbenzoylhydrazine and $POCl_3$; plates, m. 67°. $AgNO_3$ *compound*, needles, m. 185°. $HgCl_2$ *compound*. *Diacetyldibenzoylhydrazine*, AcNBzNAcBz, from AcCl and Hg dibenzoylhydrazide, or from BzCl and Hg diacetylhydrazide; plates, m. 109°. *Silver diformylhydrazine*, AgOCH : NN : CHOAg, from diformylhydrazide, NH_3 and $AgNO_3$; unstable powder, explodes when heated rapidly. *Mercuric salt* (IV), powder. With I it gives *azodiformyl*, HCON : NCHO; red and unstable. It was obtained only in soln. It decomp. almost instantly with H_2O and with PhN_2H_3 regenerates diformylhydrazine. *Mercuric diacetylhydrazide* (V), from diacetylhydrazide, EtONa and $HgCl_2$; pulverulent. With I it gives *azodiacetyl*, AcN : NAc; dark red oil. With HI or H_2S it regenerates diacetylhydrazine. *Bisdiethylacetylhydrazide*, $Et_2CHCONHNHCOCHEt_2$,

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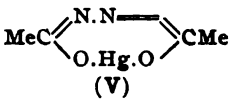
from diethylacetyl chloride, $N_2H_4.H_2O$ and Na_2CO_3; white needles, m. 230°. *Mercuric salt*, pulverulent. With Br and MgO it gives *azobisdiethyla etyl*, $Et_2CHCON : NCO$-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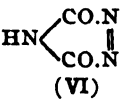
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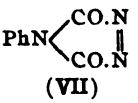
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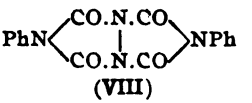
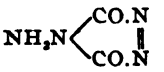

(VIII)

$CHEt_2$; red oil. It regenerates the hydrazide with $(NH_4)_2S$ and Et_2O and with H_2O given N and *tridiethylacetylhydrazine*, $(Et_2CHCO)_2NNHCOCHEt_2$, which is also formed from bisdiethylacetylhydrazide, diethylacetyl chloride and pyridine; prisms, m. 95°. *Benzoylbisdiethylacetylhydrazine*, $Et_2CHCONBzNHCOCHEt_2$, from bisdiethylacetylhydrazide, BzCl and pyridine and also from BzH and azobisdiethylacetyl; prisms, m. 123°. *Azodicarbonimide* (VI) from Ag hydrazidicarbonimide, I, BaO and MgO; violet oil. With H_2O it evolves N and CO_2. Yield, very poor. *Silver hydrazodicarbonanil*, $C_8H_6O_2N_2Ag$; powder. *Disilver salt*, yellow and curdy. With I it gives azodicarbonanil (VII); carmin-red crystals. Alc. and alkalies decomp. it instantly (gas evolution). When heated it evolves gas and forms Ph isocyanate and a *compound* (VIII); plates, sublimes into needles. *Disilver aminourazole* $C_2H_2O_2N_4Ag_2$; powder. With I it gives azodicarbon-[aminoimide] (IX); violet, highly unstable powder, ex-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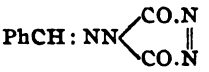
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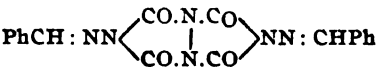
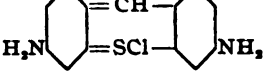
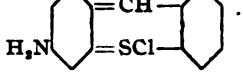

(XI)

plodes, 72°. With acid and KI it liberates I and forms aminourazole. *Disilver [benzylideneamino]-urazole*, $C_7H_6O_2N_4Ag_2$; yellow powder, explodes when heated. With I it gives benzalazodicarbon-[aminoimide] (X); carmin-red crystals; at 135–8° it becomes white, then m. about 260°. With H_2O it evolves N and regenerates the hydrazo compd. When heated it evolves N and gives a *compound* (XI); plates, m. about 285°. *Mercuric hydrazidicarboxylic ester*, $C_6H_{10}O_4N_2Hg$, powder; explodes when heated. With BzCl it gives *dibenzoylhydrazidicarboxylic ester*, $C_{20}H_{20}O_6N_2$; crystals, m. 83°. Azodicarboxylic ester is formed from the preceding Hg salt and I. Azobenzene and BzH give benzoylhydrazobenzene. J. Bishop Tingle.

Simplest Thiopyronine. F. Kehrmann and L. Löwy. Univ. Lausanne. *Ber.*, 45, 290–2.—*3,6-Diaminoxanthionium chloride* (I), from diacetaminodiphenylmethane,


(I)


(II)

S and fuming H_2SO_4, the product being treated with HCl; metallic green needles, or prisms, giving characteristic color reactions. *Carbonate*, red. *Carbinol base*, colorless crystals. *Acetate*, red. *Iodide*, scarlet-red flocks. Nitrate, red needles. *Dichromate*, dark, red flocks. *Chloroplatinate*, red crystals. With $NaNO_2$ and dil. H_2SO_4 (I) gives *3-aminoxanthionium chloride* (*apothiopyronine chloride*) (II); bluish red. *Nitrate*, red crystals. *Chloroplatinate*, dark red powder. The yield of (I) is 10% of the diacetaminodiphenylmethane, that of (II) very small. J. B. Tingle.

Isophthalanil. Rudolf Pummerer and Gustav Dorfmuller. Munich. *Ber.*, 45, 292–4.—Isophthalanil and aq. K_2CO_3 (44%) at the ordinary temp. give phthalanil almost exclusively, after 5 hrs. With 5% soln. the products are phthalanilic acid and a little phthalanil, together with some isophthalanil. The anil is formed slowly and spontaneously from the iso compd. alone, at the ordinary temp. The same change

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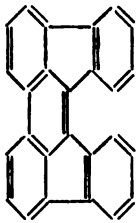
occurs quickly with b. quinoline, pyridine, or $PhNO_2$, the velocity diminishing in the order mentioned. Phthalanil does not react with C_6H_6 and $AlCl_3$, but isophthalanil gives *o*-benzoylbenzanilide, $BzC_6H_4CONHPh$. J. Bishop Tingle.

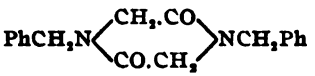
Nonexistence of Pseudodiphenylene Ketone and a New Red Hydrocarbon. Rudolf Pummerer. Munich. *Ber.*, 45, 294–8.—"Red fluorenone" is a mixt. of fluorenone with a red hydrocarbon, *rubicene*, possibly;



intensely red, lancet crystals, m. 306°. Yield, 0.2–0.5% of the diphenylenedicarboxylic acid (see Stobbe, *C. A.*, 5, 3068). J. Bishop Tingle.

Derivatives of 4-Amino-orcinol. F. Henrich, G. Taubert and H. Birkner. *Ber.*, 45, 303–14.—A yellow cryst. *compound* is formed from amino-orcinol, dil. H_2SO_4 and $K_2Cr_2O_7$. Amino-orcinol hydrochloride, under similar conditions, gives *4-chloro-3-hydroxytolu-2,5-quinone*, $O=C_6HClMe(OH)=O$; intensely yellow crystals, softens about 160°, m. 181–2°, sublimes at higher temps. Soln. in aq. alkalies and repptn. with acids converts it into a polymeric or isomeric *compound*; yellow crystals, darkens without m. about 240°. It is volatil with Et_2O. With SO_2 the quinone gives *4-chloro-2,3,5-trihydroxytoluene*, $(HO)_3C_6HClMe$; needles, m. 137.5°. It reduces Fehling's soln. immediately. *Amino-orcinol*, $H_2NC_6H_2Me(OH)_2$, from the hydrochloride and aq. NaOH; plates, darkens above 160°, decomp. 188–90° (gas evolution). It is oxidized readily by air to dyes. Orcinoldiazonium chloride, from amino-orcinol hydrochloride and amyl nitrite, forms a *cuprous chloride*, $(HO)_2C_6H_2MeN_2Cl.Cu_2Cl_2$; red crystals. At 130–200° (20–25 mm.) the diazonium chloride evolves N and gives *2-chloro-3,5-dihydroxytoluene*, $(HO)_2C_6H_2MeCl$; crystals, softens 115°, m. 138–9°. Yield, 53–6% of the diazonium chloride. With KOH and amyl nitrate it gives *6-nitroso-2-chloro-3,5-dihydroxytoluene*, $ONC_6HClMe(OH)_2$; yellow crystals, m. 159–60°, previously turning dark red, decomp. 165° (gas evolution). *Potassium salt*, $C_7H_3O_3NClK$, orange-yellow crystals. *Silver* and *nickel salts*, reddish brown and granular. *Cobalt salt*, dark reddish brown granules. The nitroso compd. gives characteristic color reactions. With $SnCl_2$ it gives *6-amino-2-chloro-3,5-dihydroxytoluene hydrochloride*; needles. Its aq. soln. is unstable in air. With dil. H_2SO_4 and $K_2Cr_2O_7$ it gives *2-chloro-5-hydroxytolu-3,6-quinone*; ruby-red crystals, m. 165–6° (decomp.). J. Bishop Tingle.

Chlorides of Amino Acids. C. Mannich and R. Kuphal. Univ. Berlin. *Ber.*, 45, 314–22.—*Ethyl benzylglycinate*, $PhCH_2NHCH_2CO_2Et$, from benzylamine and Et chloroacetate; liquid, b_{18} 153–4°. A *compound*, $PhCH_2NHCH_2CONHCH_2Ph.HCl$, is formed simultaneously; plates m. 238–9°. *Benzylglycyl chloride hydrochloride*, $PhCH_2NHCH_2COCl.HCl$, from benzylglycine, AcCl and PCl_5; needles. Yield, 90% of the benzylglycine. In b. $PhNO_2$ it gives dibenzyl-α,γ-diketopiperazine (I). *3,4-Methylenedioxybenzylamine*, $CH_2:O_2:C_6H_3CH_2NH_2$, from piperonaldoxime and Na–Hg; oil, b_{12} 138–9°. Yield, 86% of the oxime. *Carbonate. Hydrochloride*, plates, m. about



(I)

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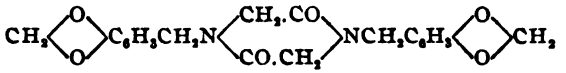
227°. *Benzoyl derivative*, needles, m. 117–8°. *Chloroacetyl derivative*, needles, m. 107–8°. *Ethyl 3,4-methylenedioxybenzylglycinate*, $CH_2 : O : C_6H_3CH_2NHCH_2CO_2Et$, from 3,4-methylenedioxybenzylamine and Et chloroacetate; oil. *Hydrochloride*, needles, m. 157–8°. *3,4-Methylenedioxybenzylglycine*, $CH_2 : O_2 : C_6H_3CH_2NHCH_2CO_2H$, from the preceding compd. and KOH; crystals, m. 206–7° (gas evolution). With AcCl and PCl_5 it gives *3,4-methylenedioxybenzylglycyl chloride hydrochloride*, $CH_2 : O_2 : C_6H_3CH_2NHCH_2COCl.HCl$; needles. When b. with $PhNO_3$ if forms *di-[3,4-methylenedioxybenzyl]-α,γ-diketopiperazine* (II); needles from $PhNO_2$, m. 234–5°.



(II)

Yield, nearly quant. *Ethyl benzylmethylglycinate*, $PhCH_2NMeCH_2CO_2Et$, from benzylmethylamine and Et chloroacetate; oil, b_{18} 138°. *Hydrochloride*, oil. *Chloroplatinate*, crystals, m. 148–9°. Picrate, yellow needles, m. 122–3°. With b. HCl the ester gives *benzylmethylglycine*, $PhCH_2NMeCH_2CO_2H$; crystals, m. 189–90°. *Hydrochloride*, crystals, softens 174°, m. 180–1°. With AcCl and PCl_5 it gives *benzylmethylglycyl chloride hydrochloride*, $PhCH_2NMeCH_2COCl.HCl$; crystals. Yield, 100% of the acid. With C_6H_6 and $AlCl_3$ it gives CO, HCHO, benzylmethylamine and *N,N'-dibenzyl-N,N'-dimethylmethylenediamine*, $(PhCH_2NMe)_2CH_2$; pale yellow oil, b_6 172–5°. Yield; 40% of the hydrochloride. B., dil. HCl hydrolyzes it to HCHO and benzylmethylamine and it gives characteristic color reactions. The diamine is also formed from HCHO and benzylmethylamine hydrochloride. J. Bishop Tingle.

Tartaric Dialdehyde. A. Wohl and B. Mylo. Danzig. *Ber.*, **45**, 322–49.—AcCl and Cu_2H_2 give AcOEt, ethylidene diacetate, alc. and AcH. Dibromoacetaldehyde and $Mg(OMe)_2$ form *tribromobutaneolone*, $Br_2CHCOCHBrCH_2OH$, or $BrCH_2COCBr_2CH_2OH$; oil, b_{14-6} 77–9°. Dry HCl, Ac_2O and glyoxal Na bisulfite form sym. dichloroethyleneglycol diacetate. Diethoxyacetic ester and K give *"hydroxytartaric dialdehyde tetraethylacetal,"* $(EtO)_2CHCOCH(OH)CH(OEt)_2$; liquid $b_{0.09-0.11}$ 67–72°. It reduces Ag and Fehling's solns. Yield, small. *Ethoxyacetopiperidide*, $EtOCH_2CONC_5H_{10}$, from Na and diethoxyacetopiperidide; oil, $b_{0.08-0.11}$ 72–4°. Yield, 50–5%. *Diethoxyacethydrazide*, $(EtO)_2CHCONHNH_2$, from Et diethoxyacetate and N_2H_4; soft crystals, m. 43–5°; $b_{0.05}$ 110°; $b_{0.1}$ 107–9°; $b_{0.45}$ 124–8°. Yield, 86%. The compd. gives ppts. with $C_2H_2O_4$ and with alc. $AgNO_3$. With HgO it forms *bis-[diethoxyacetyl]-hydrazine*, $(EtO)_2CHCONHNHCOCH(OEt)_2$; needles; m. 67–70°. With cryst. $Pb(OAc)_2$ it gives the *salt*, $Pb[NCOCH(OEt)_2]_2.Pb(OAc)_2$; needles. With basic $Pb(OAc)_2$ the *salt*, $Pb[NCOCH(OEt)_2]_2.Pb(OH)OAc$ + aq; needles. *Copper salt*, $C_{12}H_{22}O_6N_2Cu$, bluish green and flocculent. *Mercuric salt*, $C_{12}H_{22}O_6N_2Hg$, cryst. Yield, quant. Bis-[diethoxyacetyl]-hydrazine is also formed from diethoxyacethydrazide and HBO_2. Yield, 62%. With I, in CS_2, the above Hg salt is converted into *bis-[diethoxyacetyl]-azine*, $(EtO)_2CHCON : NCOCH(OEt)_2$; oil, $b_{0.070-0.08}$ 131–4°; $b_{0.19-0.2}$ 122–6°. Yield, about 77%. With alc. in place of CS_2 the products are N and diethoxyacetic ester. At 290–300° (highly reduced pressure) the Hg salt alone is converted into the azine. Prolonged b. of the azine with abs. alc. converts it into tri-Et orthoformate. Acetylenedialdehyde tetraethylacetal, $(EtO)_2CHC : CCH(OEt)_2$, from EtMgBr and C_2H_2, followed by orthoformic ester; b_{11} 126.5–7.5°. It is very unstable except in presence of a trace of piperidine. H and Pd reduce it to *maleic dialdehyde tetraethylacetal* (*ethylenedialdehyde tetraethylacetal*), $(EtO)_2CHCH : CH(OEt)_2$; liquid, b_{11} 112–2.5°; d_{25} 0.926. Yield, 82%. Aq. $KMnO_4$ oxidizes it to *tartaric dialdehyde tetraethylacetal* $(EtO)_2CHCH(OH)CH(OH)CH(OEt)_2$; oil, b_{11} 157–60°. Yield, nearly 72%. The hydrolysis of the acetal by b. 0.1 *N* H_2SO_4 has been followed quant. *Tartaric dialdehyde*,

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OCHCH(OH)CH(OH)CHO, needles. It readily reduces Ag and Fehling's solns. and has a bitter taste. *Bisphenylhydrazone*, yellow rods from pyridine + alc., m. 197.5° (cor.). *Bissemicarbazone*, crystals from glacial AcOH, m. 227.5° (cor.) (decomp.). *Dioxime*, prisms, from alc. + $CHCl_3$, m. 153.5° (cor.) (decomp.). With Br-H_2O the dialdehyde gives mesotartaric acid. J. BISHOP TINGLE.

Nitration of Acyl Derivatives of *p*-Anisidine. FREDERIC REVERDIN AND A. DE LUC. Univ. Geneva. *Ber.*, 45, 349–54; cf. *C. A.*, 6, 747.—[*3'-Nitrophenylsulfonyl*]-*4-anisidine*, $MeOC_6H_4NHSO_2C_6H_4NO_2$, from *m*-nitrophenylsulfonyl chloride, *p*-anisidine alc. and AcONa; needles, m. 135°. *Acetyl derivative*, needles, m. 181–2°. [*2'-Nitrotoluyl-4-sulfonyl*]-*4-anisidine*, $MeOC_6H_4NHSO_2C_6H_3MeNO_2$, from 2-nitrotoluyl-4-sulfonyl chloride as above; needles, m. 81°. *Acetyl derivative*, needles, m. 171°. Up to 36°, with HNO_3 (d. 1.38), [3'-nitrophenylsulfonyl]-4-anisidine gives chiefly [*3'-nitrophenylsulfonyl*]-*2,5-dinitro-4-anisidine*, $MeOC_6H_2(NO_2)_2NHSO_2C_6H_4NO_2$; orange-yellow crystals, m. 170°. It is hydrolyzed to 2,5-dinitro-4-methoxyaniline. The same product (m. 170°) is also formed up to 65°, together with [*3'-nitrophenylsulfonyl*]-*3,5-dinitro-4-anisidine* (MeO = 1); needles, m. 165–6°. Prolonged heating of the nitration mixture until gas ceases to be evolved gives [*3'-nitrophenylsulfonyl*]-*2,3,6-trinitro-4-anisidine*, $(MeOC_6H(NO_2)_2NHSO_2C_6H_4NO_2$; almost colorless prisms, m. 189–90°. With HNO_3 (d. 1.38) and AcOH the product is chiefly the dinitro deriv. (m. 165–6°). With HNO_3 (d. 1.52) up to 60° the di- and trinitro compds. (m. 170° and 189–90°, resp.) are formed. In another expt. a *substance* was produced which gave 2,3-dinitro-4-methoxyaniline when hydrolyzed. With HNO_3 (d. 1.52) and AcOH up to 52° resin was obtained, but at 5–10° a little of the dinitro compd. (m. 165–6°) was formed, the chief product being [*3'-nitrophenylsulfonyl*]-*3-nitro-4-anisidine*, $MeOC_6H_3(NO_2)NHSO_2C_6H_4NO_2$; golden yellow needles, m. 127°. The following results were obtained with [2'-nitrotolyl-4'-sulfonyl]-4-anisidine. HNO_3 (d. 1.38) up to 36°. [*2'-Nitrotoluyl-4'-sulfonyl*]-*3-nitro-4-anisidine*, $MeOC_6H_2(NO_2)NHSO_2C_6H_3MeNO_2$; lemon-yellow prisms, m. 132°. Yield, 70%. Up to 62° the product is [*2'-nitrotoluyl-4'-sulfonyl*]-*3,5-dinitro-4-anisidine*; needles, m. 125–40. Yield, 40%. When the mixture of HNO_3 and acyl compd. is heated until evolution of N oxides ceases the above dinitro compd. (m. 125–40°) is formed (yield, 5%) and [*2'-nitrotolyl-4'-sulfonyl*]-*2,3,6-trinitro-4-anisidine*, $MeOC_6H_2(NO_2)_2NHSO_2C_6H_2MeNO_2$; needles, m. 184–5°. Yield, 10%. With HNO_3 (d. 1.38) and AcOH, up to 67°, the 3,5-dinitro compd. (m. 125–40°) is formed. Yield, 75%. With HNO_3 (d. 1.52) at 5–10°, [*2'-nitrotolyl-4'-sulfonyl*]-*2,3-dinitro-4-anisidine*, $MeOC_6H_2(NO_2)_2NHSO_2C_6H_2MeNO_2$, is obtained; almost colorless prisms, m. 180°. Yield, 34%. Accompanying this is [*2'-nitrotoluyl-4'-sulfonyl*]-*2'5-dinitro-4-anisidine*; lemon-yellow needles, m. 154°. Yield, 30%. At higher temps. the HNO_3 (d. 1.52) gives only sol. decomp. products. Up to 60°, HNO_3 (d. 1.52) and AcOH give a mixture of the above mononitro compd. (m. 132°) and the 2,5-dinitro deriv. (m. 154°). Yield, 20 and 100%, resp.; it depends somewhat on the proportion of acid and acyl compd. J. BISHOP TINGLE.

Constituents of Ethereal Oils. Derivatives of Natural "Cedrene." F. W. SEMMLER AND FELIX RISSE. Breslau. *Ber.*, 45, 355–60.—"Cedrene," the sesquiterpene, or mixt. of sesquiterpenes from the Amer. cedar (*Juniperus virginiana*) with O_2, in glacial AcOH, gives a *ketone*, $C_{14}H_{24}O$, or, $C_{14}H_{22}O$; liquid, b_{18} 120–30°; d_{20} 0.9494; n_D 1.48917; α_D —29° 36'. *Semicarbazone*, m. 218°. A *ketoaldehyde*, $C_{15}H_{24}O_2$, is also formed; liquid, b_{18} 170–80°; d_{20} 1.0386; n_D 1.50433; α_D —26°. The acid product of

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the ozonization was *cedreneketonic acid*, $C_{15}H_{24}O_3$; liquid, b_{10} 205–15°. *Methyl ester*, liquid, b_{10} 165–70°; d_{20} 1.0509; n_D 1.4882; α_D^{29} —32° 24′. HNO_3 or NaOBr oxidize the acid to cedrenedicarboxylic acid, $C_{14}H_{22}O_4$; needles from HNO_3 (7%), m. about 182.5°. *Silver salt. Dimethyl ester*, liquid, b_{12} 179–83°; d_{20} 1.0778; n_D 1.48084; α_D —31° 36′. J. BISHOP TINGLE.

Homochromoisomerism of Methylphenylpicramide. A. HANTZSCH. *Ber.*, 45, 360–3.—Reply to Biilmann (*C. A.*, 6, 272).—The amide m. 108° requires b. with alc. during 45 mins. in order to convert it completely into the high m. (128°) form. J. BISHOP TINGLE.

Ethyl Orthotrithioformate. BROR HOLMBERG. Univ. Lund. *Ber.*, 45, 364–5.—The Et orthotrithioformate prepared by H.'s method (*C. A.*, 1, 1975) is exactly equal in purity to that obtained by Houben and Schultze's process (*C. A.*, 6, 487). J. BISHOP TINGLE.

Luteoic Acid. Correction. M. NIERENSTEIN. Univ. Bristol. *Ber.*, 45, 365.—Luteoic acid, $C_{14}H_8O_6$, dried at 160°, contains 50.66–51.06% of C. After being dried at 240° the specimens described previously (*C. A.*, 3, 61, 1015; 4, 1306, 2476) contain C 52.72, 52.64 and 52.64%, resp. J. BISHOP TINGLE.

Reduction of Ketones (TAFEL). 4. Theory of Refraction Constants (WIENER). 2. Colloidal Chlorophyll (HERLITZKA). 11D. Organic Combustion Analyses (MAREK). 7. Oxidases and Essential Oils (BROOKS). 17. Iodoaliphatic Derivatives of Cholesterol (ABDERHALDEN, GRESSEL). 11H. Precipitation of Protein by Zinc Sulfate (LIPPICH). 11A. Turkey Red (KORNFELD). 25.

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11. BIOLOGICAL CHEMISTRY.

WILLIAM J. GIES.

A. GENERAL.

FRANK P. UNDERHILL.

Carbon Dioxide Output during Decerebrate Rigidity. HERBERT E. ROAF. *Proc. Roy. Soc. London*, (*B*) 83, 433–4; through *J. Chem. Soc.*, 100, II, 503.—The abolition of decerebrate rigidity in cats by means of intravenous injections of curare does not lower the CO_2 output, and hence the postural tonus requires very little expenditure of energy. When the tonus of the decerebrate prep. is abolished by decapitation, a marked fall in the CO_2 output is produced; this is not due to the abolition of tonus or to the fall in blood pressure. E. J. C.

Antipepsin. I. SERAFINO DEZANI. *Atti accad. sci. Torino*, 46, 371–80; through *J. Chem. Soc.*, 100, II, 621.—The conditions of action of antipepsin were investigated. Gastric mucus of a freshly killed pig was well stirred up for 10 min. with an equal wt. of 0.35% HCl, then left to digest for 50 min. at 50–60°, and filtered; a yellow liquid, d. 1.010–1.016, was obtained, which gave 1.926–2.360% of solid residue and 0.25–0.32% of ash. It showed the biuret and Millon reactions, but in most cases it possessed no proteolytic properties. This liquid, which contains no free HCl, arrests digestion completely, its antipeptic properties being somewhat diminished by the addition of HCl in the proportion present in normal digestive fluids. About $^1/_4$ part of the ash of the ext. consists of Ca phosphate, which exerts a function analogous to that of the co-enzymes, since the dialyzed ext. exhibits no antiproteolytic properties and regains these partly on addition of the phosphate. But, since the existence of an enzyme which resists b. cannot be admitted, antipepsin must be regarded as a substance

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capable of forming, with Ca phosphate, a labil compound, which is dissociated by dialysis and re-formed by addition of the original proportion of the salt. E. J. C.

Remarks on Henze's Paper: "The History of Iodogorgonic Acid." ADOLF OSTWALD. *Z. physiol. Chem.*, 74, 299–300; cf. Henze, *C. A.*, 5, 3223. A. HUNTER.

The Precipitation of Protein by Zinc Sulfate. FRITZ LIPPICH. Univ. Prag. *Z. physiol. Chem.*, 74, 360–91.—When protein is pptd. by increasing conc. of $ZnSO_4$, there are 2 maxima of pptn., the 1st beginning at 0.08–0.1 *N*, the 2nd at 1.8–2 *N*; between lies a minimum at which the liquid remains for a time clear. Equal vols. (5–10 cc.) of dil. horse serum were treated with graduated amts. (0.1–1.0 cc.) of satd. soln. of $ZnSO_4$, and made up to a round vol. (50–200 cc.). The conditions corresponded to rapid equil. at the lower max. The ppts. contained, independently of the conc. of protein and the original conc. of $ZnSO_4$, always the same amt. of Zn. The capacity of the protein to combine with Zn apparently increases with the diln.; that the Zn pptd. per unit vol. remains the same seems to indicate a combination in const. proportions. The ppts. produced at the 2nd max. contain about twice as much Zn. The results are difficult to reconcile with the adsorption hypothesis. They suggest rather a balanced reaction according to the scheme: $ZnSO_4 + 2Na$ protein $\rightleftarrows Na_2SO_4 + Zn(protein)_2$. Most of the facts can be explained by the further assumption that, as salt conc. and other conditions vary, there arize such types of compd. as $ZnSO_4$.protein; Zn.protein.-$ZnSO_4$; and Zn.protein. A. HUNTER.

The Composition of Different Varieties of Silk. XIII. EMIL ABDERHALDEN. *Z. physiol. Chem.*, 74, 427–8.—The silk of the *Anaphe* nest contains tyrosine, alanine, and glycine as principal constituents; aspartic and glutamic acids, with traces of leucine and proline, are also present. A. HUNTER.

Remarks on the Paper by A. H. Koelker. EMIL ABDERHALDEN. *Z. physiol. Chem.*, 74, 509–10; cf. *C. A.*, 6, 99.—Priority claim. A. HUNTER.

Preservative Materials Used by the Ancient Egyptians in Embalming. A. LUCAS. Ministry of Finance, Egypt. Survey Dept., *Paper* 12.—The most ancient mummies were preserved without the practise of any art but by natural agencies. The bodies were buried in shallow graves in the hot, dry sand where they were thoroughly desiccated and were thus preserved in the arid climate. The natrum bath described by Herodotus as a part of the embalming process is considered by L. to have consisted of a soln. of natural soda consisting of Na_2CO_3, $NaHCO_3$, Na_2SO_4 and NaCl. These deposits are found in various parts of Egypt. Expts. by L. show that such a soln. would affect bodies similarly to the way mummies were evidently acted upon. Chem. analysis of mummies support the theory that such an alk. soln. was used. Salt was sometimes used, the salt being simply placed on the outside of the body which was then wrapped in cloth. Of 9 samples of true resin examd., 7 were apparently not from any species of pine while 2 were probably from a coniferous tree. 8 samples of gum resins were believed to be myrrh; 5 samples could not be identified. L. believes that alum and lime were never used as preservatives for dead bodies. The Al found in mummies may be derived from the alkali bath used or from adventitious kaolin or Al silicates. The Ca is probably derived from the limestone rocks surrounding the graves. Pitch, often referred to as an embalming substance and supposed to be the natural bitumen of the Dead Sea, was probably not extensively used by the ancients. None of the samples of pitch-like materials examd. was bitumen. Most were resin, some gum, and a few wood pitch. Much of the black material hitherto described as pitch is not pitch at all, and in those instances where it is pitch, it is wood pitch and not mineral pitch. J. F. LYMAN.

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The Formation of Lactic Acid in Muscle during Autolysis and in Post-survival Periods. W. M. FLETCHER. Cambridge. *J. Physiol.*, 43, 286–312.—In mammalian as in amphibian muscle (*J. Physiol.*, 35, 261) lactic acid production is accelerated by mechanical injuries, and at body temp. the max. amt. is reached within an hr., but never instantaneously. At room temp. the attainment of the max. yield is much delayed. Rapid destruction of the surviving muscle by heat stops the formation of lactic acid. No evidence of an autolytic enzyme in muscle leading to the formation of lactic acid from dextrose was obtained when the sugar was added to intact surviving muscle or to minced preps. which were kept aseptic. J. F. LYMAN.

Remarks on the Question of Quadriurates. W. E. RINGER. Utrecht. *Z. Physiol. Chem.*, 75, 13–8.—Previous expts. have not proven the non-existence of quadriurates. Compds. possessing the properties of quadriurates, even if they are not chem. entities, can be assumed to exist as mixed crystals. G. M. MEYER.

Changes in the Physical States of Colloids. XI. The Swelling of Gelatin in Acids and Alkalies. RICHARD CHIARI. Vienna. *Biochem. Z.*, 33, 167–81.—Gelatin absorbs the least amt. of H_2O from solns. of isoelec. H ion conc., 2.10^{-5}. Gelatin carefully freed from electrolytes is very sensitive in its absorbing capacity towards slight changes in the reaction of the soln. in which it is immersed, even the CO_2 in ordinary dist. H_2O causing a noticeable deviation from the results obtained with cond. H_2O. From the isoelec. pt. the relation, $K_{(acid)}/K_{(base)} = 5.6 \times 10^4$ is calc. Of acids with different strengths, the weaker cause more marked swelling of gelatin when isohydric solns. are compared, lactic acting more strongly than HCl, and AcOH more strongly than lactic. CCl_3COOH and H_2SO_4, however, are exceptional in their reaction, presumably because of the slight ionization of their protein salts. The weak bases, NH_3, pyridine, and nicotine, act, like the weak acids, more strongly than their OH ion concs. would indicate when compared with strong bases, their action being analogous to that of weak acids. Amphoteric electrolytes are less effective in causing swelling of gelatin than are acids of similar dissociating power. D. D. VAN SLYKE.

The Acid Coagulation of Lecithins and Lecithin-Protein Mixtures. J. FEINSCHMIDT. Berlin. *Biochem. Z.*, 38, 244–51.—Different lecithin preps. show quite sharp optimum H ion concs. for coagulation at 10^{-2}–10^{-4}. Neutral salts make the suspensions more cloudy, but hinder the true coagulation and make the optimum indistinct. Mixing lecithin and protein results in a new complex, which coagulates in coarser form. Its optimum H^+ conc., which is less sharply marked than that for unmixed lecithin suspensions, lies nearer the neutral pt. than that of the latter. D. D. VAN SLYKE.

Formaldehyde Titrimetric Investigations on Proteins. I. FRIEDRICH OBERMAYER AND ROBERT WILHELM. Vienna. *Biochem. Z.*, 38, 331–43.—The proportion of the N present as free amino groups, as titrated by the Soerensen formaldehyde method, was detd. in the albumin and globulins from blood of the horse, ox, pig, goat, chicken, eel, shark, and octopus. In all cases the albumins showed a much larger proportion of amino N than the globulins. The authors express the results in terms of the "amino index." which is the ratio (total N) : (amino N). For the albumin of horse serum this index was 13.3–13.8; for the euglobulin it was 19.8–22.3; for the pseudoglobulin it was 19.1–22.1. The index shows the no. of atoms of N present for each NH_2 group, and is inversely proportional to the NH_2 content of the protein. D. D. VAN SLYKE.

A Contribution to the Chemistry of the Intestinal Contents. R. BOEHM. *Biochem. Z.*, 33, 474–9.—A portion of a woman's intestin was, as the result of an operation,

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sepd. from the rest of the canal, and remained as a blind loop until the woman's death 14 yrs. later. It contained several g. of dihydrocholesterol. D. D. VAN SLYKE.

Synthesis of Fat by means of Plant Lipases. SERGIUS IVANOV. *Ber. botan. Ges.*, 29, 594–602.—Unripe flax, poppy and rape seeds were ground up with sand and glycerol; the glycerol ext. was mixed with c. p. oleic acid and thymol, and the change in acidity of the mixt. noted by means of titration. In an 8–10% aq. soln. a decrease in acidity and fat synthesis was established. In a 60–80% soln. of the glycerol and ext. oleic acid to which oil from the seeds was added showed an increase in acidity, indicating that in dil. soln. lipase acted in a splitting manner. When the glycerol ext. was repeatedly pptd. with alc., a substance was obtained which had the synthesizing and splitting properties as the original glycerol ext., but to a less degree. In order to test whether the same lipase which is capable of splitting fats can also synthesize, a glycerol ext. was made of seedlings of *Helianthus annus* and pptd. with alc. This substance produced a decrease in the acidity of the glycerol-oleic acid mixt.

H. A. SPOEHR.

The Formation, Significance and Chemistry of the White and Yellow Yolks of Ova. OSCAR RIDDLE. Univ. Chicago. *J. Morph.*, 22, 455–91.—By feeding Sudan III to fowls a means of measuring the growth of ova has been found. The yolk of the egg of the common fowl increases in diam. about 4 mm. in 24 hrs. From 85 to 95% of this increase is the "yellow yolk," which is deposited while the nutritive conditions are at their best; the remainder is "white yolk" deposited during the later hrs. of the night, (1–5 A.M.). Reversible enzymes (lipase, etc.) cause the formation and deformation of yolk. Yellow yolk contained 47.8 moisture, 49.2 fat, 20.9 phosphatides, 0.6 extractives and 28.8% protein. White yolk contained 88.1 moisture, 36.8 fat, 11.1 phosphatides, 3.4 extractives, and 43.5% protein. Resorbed yolk contained 63.2 moisture, 45.7 fat, 15.3 phosphatides, 2.0 extractives and 35.2% protein. The av. of 3 analyses of the contents of the yolk sac (18 days' incubation) gave 49.2 moisture, 40.7 fat, 15.9 phosphatides, 2.4 extractives and 38.7% protein. When yellow yolk is subjected to digestive action either in the ovary (resorbed) or in the yolk sac of the embryo, each component approaches more nearly to that quantity characteristic of the white yolk. The fat and phosphatides digest and disappear much more rapidly than the protein. Histological data and discussion are given. R. A. GORTNER.

Cholesterol Obtained from the Skull Contents of an Egyptian Mummy. EMIL ABDERHALDEN. *Z. physiol. Chem.*, 74, 392–3.—The skull contents of an Egyptian mummy yielded crystals giving the reactions of cholesterol, and identified as such by the prep. of cholesteryl chloride and cholestene. A. HUNTER.

Chemistry of the Hen Egg. KENJI KOJO. Univ. Berlin. *Z. physiol. Chem.*, 75, 1–12.—The white of egg consists on an av. of 87.71% H_2O, 12.29% solids, 0.4% ash, 11.89% organic substance. N of total = 1.75%. Glucose 0.55% equivalent to 4.47% of the dry material or 4.64% of the total organic substance. Egg yolk contains 49.73% H_2O, solids 50.27, ash 1.44. Organic 48.83. N = 2.49%, glucose 0.27 equiv. to 0.54 of the dry substance or 0.55 of the organic. G. M. MEYER.

The Significance of the Processes of Swelling and Shrinkage for the Onset and the Relaxation of Post-mortal Rigor. OTTO VON FUERTH AND EMIL LENK. Vienna. *Biochem. Z.*, 33, 341–80.—When muscles of cat or frog were excized and immediately placed in H_2O they began to imbibe water, and reached a max. wt. after several hrs., the max. being followed by a drop; immersed in dil. lactic acid these effects were greatly intensified. In 0.05 *N* acid an increase of 109% was noted after 24 hrs., the increase falling to 17% in the next 3 days as the result of loss of most of the previously imbibed H_2O. The authors believe, therefore, that rigor results from the swelling of the fibrillar

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elements of the muscles, which take up H_2O from the sarcoplasm, and that this imbibition is due to the action of the lactic acid which accumulates in the muscles after cessation of the circulation. The subsequent relaxation is due to coagulation of the muscle proteins. This explanation of relaxation is supported by the observation that NaCNS and Na salicylate, which coagulate plasma proteins, prevent rigor when infused into the muscle vessels. It is probable that also the chem. rigor caused by veratrine, caffeine, quinine, and $CH_2BrCOONa$ result from a stimulated lactic acid formation, the result of which is swelling of the fibers. The fact that chem. rigor cannot be induced in muscles which have previously undergone normal rigor and relaxation is due to the inability of the tissues to form a new supply of lactic acid. The imbibition theory of rigor explains the diff. in time between the coagulation of the muscle plasma and the onset of rigor; the possibility of renewing irritability in a stiff muscle by renewing the circulation; the acceleration of the onset of rigor as the result of muscle work; the fact that rigor disappears the more rapidly the quicker its onset; and the inhibition of rigor observed by Fletcher and Hopkins in an atm. of O. The faculty of imbibing H_2O for a limited time after excision and then giving off again a part of it is not peculiar to the muscles, but is also shown by other organs, as was demonstrated with spleen and kidney. Even beans showed an imbibition in 0.1 *N* lactic acid which reached a max. and then fell appreciably. The behavior seems to be common to all organized protoplasm. D. D. VAN SLYKE.

The Non-dependence of Diastatic Action on Lipoids. EMIL STARKENSTEIN. Univ. Prague. *Biochem. Z.*, 33, 423–35.—Extraction of dog liver, its plasma or suspension, with ether, toluene or alc. did not diminish the diastatic power. D. D. VAN SLYKE.

Diastase (CHRZAKZCZ). 16.

B. METHODS AND APPARATUS.

STANLEY R. BENEDICT.

Experiments with the Biuret Reagent (Detection of Protein, Etc.). J. L. KANTOR AND WILLIAM J. GIES. *Proc. Am. Soc. Biol. Chem.*, 1910, 17–8; *J. Biol. Chem.*, 9; *J. Chem. Soc.*, 100, II, 554.—Paper and other forms of cellulose completely decolorize the biuret reagent (also Fehling's soln.), a Cu cellulose product being formed. Such paper may be used for the detection of protein or of reducing substances. E. J. C.

Lecithins Ex ovo. A Characteristic Color Reaction for them and a Change which they Always Undergo. CARLO CASANOVA. *Boll. chim. farm.*, 50, 309–13; through *J. Chem. Soc.*, 100, II, 673.—The emulsion of lecithins is freed from alc. and extracted with ether. The conc. ethereal soln. is treated with 2 cc. of $(NH_4)_2MoO_4$, then gradually with conc. H_2SO_4. A cherry-red coloration, becoming green and finally intensely blue, appears at the surface of contact of the 2 liquids. Cholesterol and phytosterol do not give this reaction. The lecithins alter readily in air, especially in aq. suspension, and the change is accompanied by an increase in the quantity of free acid present. Alc. solns. are more stable. E. J. C.

Reactions of Van Deen and Adler. CORRADO BONGIOVANNI. *Boll. chim. farm.*, 50, 201–3.—Tarugi, finding that the blue coloration with H_2O_2 and guaiacum or benzidine was given also by thiocyanates, suggested that these reactions of blood are due to thiocyanates, which act as peroxydases, yielding peroxygenated substances which oxidize the guaiacum or benzidine. B. shows that this is improbable, because the coloration is given by chromates, small quantities of Br and other oxidizers, so that it cannot need the presence of peroxygenated compds. Moreover, the red solns. obtained from thiocyanates and ferric salts, which may contain a peracid, do not give the benzidine reaction. E. J. C.

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Rapid Method of Estimating Uric Acid in Urin. P. P. PIZZORNO. *Boll. chim. farm.*, 50, 237–8.—Excess 0.05 *N* I soln. is added to the urin (previously boiled and decolorized with animal charcoal), and the I then estd. with $Na_2S_2O_3$. The difference represents the amt. used in oxidizing the uric acid to alloxan and urea. If the urin contains solid uric acid, this is brought into soln. by adding Na_2CO_3. Albumin is removed by acidifying the urin with AcOH, adding NaCl, and b. for ½ hr. (cf. following abstr.). E. J. C.

Iodometric Estimation of Uric Acid in Urin. D. VITALI. *Boll. chim. farm.*, 50, 365–6.—V. has already described (*L'Orosi*, 21, 73–80 (1898); *J. Chem. Soc.*, 76, I, 117) the above reaction (cf. preceding abstr.), but did not propose it as a method of estn., because there may well be other substances in urin which will consume I. E. J. C.

Estimation of Halogens in Lipoids. H. CAPPENBERG. *Pharm. Ztg.*, 56, 677; through *J. Chem. Soc.*, 1911, II, 927.—One g. sample is covered in a porcelain crucible with a piece of cotton wool and 10 cc. of a 10% soln. of KOH in MeOH added. The contents of the crucible are evapd. to dryness at a temp. below the b. p. of the alc., then ignited over a low Bunsen flame for 1 hr., and the carbonized residue dissolved in 100 cc. of hot water. The soln. is filtered, rendered acid with HNO_3, and the halogen pptd. by $AgNO_3$. E. J. C.

Rapid Gravimetric Estimation of Urinary Albumin. E. SIMONOT. *Bull. soc. chim.*, [4] 9, 839–42; through *J. Chem. Soc.*, 100, II, 945.—Five g. of $NaPO_3$ are dissolved in cold water and made up to 100 cc., or 5.70% of the metaphosphate may be dissolved by b. in water during 5 min. and made up to 100 cc. If the urin contains more than 0.5 g. albumin per l. enough to yield about 10 g. is taken, filtered, made up to 100 cc., heated on the water bath during 10 min. (15 min. if the quantity is 200 cc.), and then for every 100 cc. of liquid 5 cc. of the metaphosphate soln. and 1 cc. of HCl are added and the heating continued during 5–10 min. The coagulum is filtered on a dry tared filter and washed with b. water until free from HCl, and then twice with alc. and once with ether. As much liquid as possible is removed by gentle pressure, and the coagulum dried at 110–20°. The wt., recalc. for 1 l. of urin and multiplied by 0.88, gives the amt. of albumin per l. in the urin examd. By this method complete pptn. of the albumin in a form in which it can be easily and rapidly filtered and washed is brought about. E. J. C.

An Error in the Use of the Nylander Sugar Test. PHIL. E. STRAUSS. Frankfurt a/M. *Münch. med. Wochschr.*, 59, 85.—It is necessary in testing urin to control the Nylander test by some additional test, as the urin after the administration of "Iothion" (diiodohydroxypropane) in diabetics will give a negative Nylander test while Fehling's and polariscopic tests are positive. KI or I does not interfere with the Nylander test *in vitro* while "Iothion" does. H. J. CORPER.

Methods for the Recognition of Submicroscopic Structures. JOH. KOENIGSBERGER. *Z. wiss. Mikroskop.*, 28, 34–41; through *Chem. Zentr.*, 1911, II, 1267.—Besides the ultramicroscope, double refraction and the deviation of the polarized ray may be made use of. In the latter case a grating is necessary whose constant must be as small or smaller than the light wave. Although this is not possible mechanically, it has been found possible to obtain such a grating by the use of Zenker's Ag films, the basis of Lippmann's color photography, since the intervals between the dark non-reflecting Ag grain films are equal to half the wave length of the light to which they are exposed. The polarization effect of such a film has a max. of 65% (for yellow-red light). The elec. vector of the light corresponding to the phenomena of elec. waves, perpendicular to the grating bars is more easily transmitted than the component

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vibrating parallel to it. The smaller the grating constant or the interval between 2 bars, the greater the polarized portion. In this way could be deduced for plant and animal preps. of unknown structure the existence of submicroscopic fission. This occurred among others with preps. of cerebrum and cerebellum of the cat and with nerves and muscles, very considerable differences being noticed in the above regard.

L. RAY FERGUSON.

The Application of Elastin to the Detection of Proteolytic Enzymes. EMIL ABDERHALDEN AND KARL KIESEWETTER. *Z. physiol. Chem.*, 74, 441–26.—By the elastin method proteolytic enzymes were demonstrated in feces, various organs, and press-juice from the same. The digestion of elastin, and of native and coagulated egg albumin, by gastric juice as well as by pepsin-HCl, was studied by the optical method; results obtained with gastric juice and with pepsin-HCl are not directly comparable.

A. HUNTER.

The Losses Occurring in the Isolation of Monoamino Acids by the Ester Method. I. EMIL ABDERHALDEN AND ARTHUR WEIL. *Z. physiol. Chem.*, 74, 445–71.—In a single application of the ester method to the pure amino acid, the loss amts. with aspartic acid to about 40, with glutamic acid to about 30%. Loss occurs at each operation—esterification, distillation, and sapon. A. HUNTER.

The Preparation of Pure Invertase. R. O. HERZOG. *Z. physiol. Chem.*, 74, 511.—Claim of priority against Euler and Kullberg (*C. A.*, 6, 377). A. HUNTER.

The Extraction of Zymase by Simple Maceration. A. LEBEDEV. *Ann. inst. Pasteur.*, 26, 8–37; cf. *C. A.*, 5, 2394.—L. describes a method of extraction of zymase from yeast, by which a better juice is obtained than by the usual Buchner method of extraction. A pail of yeast, preferably the Munich variety, is washed over night in running water in a 50 l. tank. After decantation of the supernatant fluid, the settled yeast is spread out in a layer 1–1½ cm. thick and allowed to dry 2 days at 25–35°. The dry product is allowed to macerate 2 hrs. at 35° with 3 vols. water and is then filtered on ordinary filter paper. The juice so obtained is quite const. in its activity. The dry yeast may be preserved a long time (2 yrs.) without marked deterioration. As the juice does not contain glycogen, it does not undergo auto-fermentation. Besides the usual enzymes obtained by the grinding method it contains endotryptase. There is no direct relationship between its activity and its endotryptase content. The success of this method is due (1) to the weakening of the cell membrane by the desiccation, and (2) to the action of an enzyme, most active at 35°, which dissolves the cell membrane. E. R. LONG.

A New Form of Differential Micro-calorimeter, for the Estimation of Heat Production in Physiological, Bacteriological, or Ferment Actions. A. V. HILL. Cambridge. *J. Physiol.*, 43, 261–85.—The app. consists of 2 vacuum thermos bottles, whose coeffs. of cond. for loss of temp. are the same or known, and a Cu-constantan thermocouple, connected with a sensitive galvanometer so that the deflection of the galvanometer mirror gives the difference of temp. in the 2 flasks. The material under study is placed in one flask and the proper amt. of H_2O in the other. By means of the galvanometer the rise in temp. in the expt. flask may be detd. The heat produced by living resting frogs, by resting muscle, by milk during souring, by the action of yeast cells on cane sugar, and by the action of saliva on starch was measured. The heat liberated when 1 g. of starch is hydrolyzed by saliva is only 0.5 cal.

J. F. LYMAN.

Determination of Carbohydrates by Oxidation with Alkaline Permanganate. W. GREIFENHAGEN, J. KOENIG AND A. SCHOLL. Münster. *Biochem. Z.*, 35, 169–93.—All sugars, polyalcs., their aldehydes and ketones, also polysaccharides are oxidized

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quantitatively in alk. sol. by $KMnO_4$ to oxalic acid and CO_2. The end carbon atoms are oxidized to CO_2, the inner ones to oxalic. Formic acid could not be detected. (I) Complete oxidation of sugars: Measured amts. of sugar soln. are mixed with 0.2 *N* or *N* $KMnO_4$ and 10% KOH (30 mg. glucose require 40 cc. 0.2 *N* $KMnO_4$ and 60 cc. KOH) and boiled for 10 min. Glass beads are added to the Erlenmeyer flask, which is also provided with a long wide tube to prevent loss by bumping. The mixt. is cooled to 70°, acidified with H_2SO_4 and 0.4 *N* oxalic acid added in excess. This excess is titrated back with 0.2 *N* $KMnO_4$. (II) Partial oxidation of sugars: After b. (20 cc. 20% KOH + 25 cc. *N* $KMnO_4$ to 5 cc. 0.1 *N* glucose) for 10 min. as per (I) the excess $KMnO_4$ is destroyed by perhydrol, the MnO_2 rapidly filtered off and CO_2 detd. in the filtrate according to Fresenius and Classen, acidifying with AcOH. Oxalic acid is detd. as Ca oxalate. Sugar may be identified by the ratio of CO_2 to oxalic acid (1 : 1). *E. g.* Monosaccharides, $C_6H_{12}O_6 + 5O_2 = 2H_2C_2O_4 + 2CO_2 + 4H_2O$. These methods are also adapted for the detn. of similar compds. as starch, dulcitol, mannitol, MeOH, glycerol, glycol, etc. G. M. Meyer.

Determination of Starches. W. Greifenhagen, J. Koenig and A. Scholl. Münster. *Biochem. Z.*, 35, 194–216.—The polarimetric methods of Lintner and Ewers are adaptable to all starches. The sp. rotation by the Lintner method is practically the same for all starches—av. + 202°. In the Ewer's method it is not the same for all. It is essential to wash the starch before digestion with water, alc. and ether to remove interfering substances, particularly in such as cinnamon, which contain optically active substances. The above methods are sufficiently accurate for general purposes. G. M. Meyer.

Determination of Glucose in the Urin and Blood. Berthold Oppler. Univ. Göttingen. *Z. physiol. Chem.*, 75, 71–134; *C. A.*, 5, 146.—The detn. of glucose in urin containing indican, glucuronic acid and uric acid cannot be undertaken without a previous treatment to remove these and other *l*-rotatory substances which prevent the complete pptn. of Cu_2O. The reduction process is also greatly influenced by delayed boiling in urin of high sp. gr. This is overcome by the addition of 8 cc. 95% alc. to 12 cc. urin. The interfering substances are removed by shaking the urin with powdered $Pb(OAc)_2$ and removing the excess of Pb with H_2S. The filtrate is then shaken with weighed amts. of phosphotungstic acid and the excess removed after 12 hrs. with $Pb(OAc)_2$. The Pb is removed as before. The filtrate is used for the detns. The method is also applicable to sugar detns. in the blood. G. M. Meyer.

A Simple Coagulometer. H. H. Dale and P. P. Laidlaw. Wellcome Lab., Lon. *J. Path. Bact.*, 16, 351–62.—This consists of a short length of capillary glass tubing, having an internal diam. of about 1.3 mm., into which a small shot weighing about 9 mg. has been introduced, and the ends narrowed to prevent the escape of the shot. A specially designed pair of tongs is of great service, but is not essential. As soon as the tube is filled with blood, it is placed in the tongs, the jaws of which have been prepared with clean plasticin, and the tube immersed in H_2O at 37°. The tube is gently rotated, the shot rolling back and forth. The end point taken is the moment the shot stops with the tube in the vertical position. J. H. Mitchell.

Test for Benzoic Acid and Salicylic Acid in Milk and Fats. Thomann. *Schweiz. Wochschr.*, 50, 23–4.—T. reports on the method of Philippe (*Veröffentl. d. Schweiz. Gesundheitsamtes*, 1911, 2, No. 6). 100 cc. of milk are treated with 40 cc. of Fehling's Cu soln., then with 10 cc. *N* NaOH and 150–200 cc. H_2O. Stir, filter into sep. funnel; to the clear liquid add 5 cc. conc. HCl and shake out with Et_2O 2 or 3 times. Filter the Et_2O exts. and evap. in glass dish of 5 cm. diameter. The residue will cryst. if only 2 mg. BzOH or salicylic acid per 100 cc. are present. If cryst., sublime upon

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watch glass kept cool with H_2O. The microscope distinguishes both acids by their crystal form. Salicylic acid is proved by $FeCl_3$ test in H_2O soln., BzOH by the method of Jonescu (*C. A.*, 3, 1781, 2184), which is sensitive to 1 mg. of acid in 100 cc. of milk. The method of Mohler (1890), modified by C. von der Heide and F. Jakob, is very delicate yet somewhat complicated. T. also reports on the method of W. Fries to test for BzOH in margarine, butter, etc. (cf. *C. A.*, 6, 781). S. WALDBOTT.

Glucuronic Acid Determinations (Tollens) in Duodenal Obstruction. J. W. DRAPER AND F. W. SCHULTZ. Univ. Minn. and Rochester, Minn. *Proc. Soc. Exp. Biol. Med.*, 9, 28–9.—By administering camphor to dogs and detg. the output of camphor glucuronic acid, both before and after duodenal obstruction, the authors attempted to measure any impairment in liver function which might follow this intestinal lesion. (The conjugation of camphor with glucuronic acid takes place largely in the liver, according to Pohl). Somewhat less than $^1/_2$ the camphor given during the normal period was recovered in the urin as camphor glucuronic acid, and less than $^1/_4$ after obstruction. V. C. MYERS.

The Influence of Soda on the Wassermann Reaction. HERMANN MAYER. Berlin. *Deut. med. Wochschr.*, 38, 270.—Na_2CO_3 has no hemolytic action. In the strength (0.015%) used in pharmacopeial physiol. salt soln. it does not affect the Wassermann reaction. In higher concs. (0.15% and 1.5%), however, it inhibits hemolysis. H. J. CORPER.

C. BACTERIOLOGY.

ERNEST D. CLARK.

What do we know about the Evolution of Heat by Microörganisms, and their Role in Spontaneous Heating (Spontaneous Combustion) of Stored Organic Materials, Especially Products of the Sugar Industry? ALBERT SCHÖNE. *Deut. Zuckerind.*, 36, 608–11.—A storage bin, containing about 1000 tons of raw sugar, exploded with some flame; In the center was found a mass of decomposed sugar, dark colored and hot. When investigated some time later, it had an odor of formic and acetic acids, a strongly acid reaction, and 7.5% invert; the color was easily removed with basic $Pb(OAc)_2$. Bacteriological tests were made on the decomposed sugar, and sugar from the edges of the affected area. The latter contained both a form of *Actinomyces* and of *Semiclostridium;* the former *Semiclostridium* only. Both forms have been identified with fermentations which evolve heat, and are considered to be the cause of the explosion. A bibliography of instances of violent fermentations of stored sugar products is given. W. L. BADGER.

The Influence of Quartz Sand upon Bacterial Cultures. OTTO RAHN. *Centr. Bakt. Parasitenk. II Abt.*, 32, 201.—Liquid nutrient media (milk and peptone) were tested when absorbed by quartz sand. Aerobic processes were hastened whereas anaerobic were decreased when aeration was supplied. Both aerobic and anaerobic processes were favored when the liquid entirely covered the sand. H. J. CORPER.

Formation and Fermentation of Formic Acid by Yeast. H. FRANZEN. *Chem. Ztg.*, 35, 1097.—Considerable quantities of HCO_2H are formed in the fermentation of sugar by yeast. Yeasts ferment HCO_2H, added in the form of HCO_2Na, so that the amt. of HCO_2H found in a soln. after fermentation has proceeded for some time, represents the difference between the amts. formed and decomposed. The formation and decomp. of HCO_2H are enzymic processes, for they can be effected with expressed yeast juice. F.'s results are in accord with Schade's view that HCO_2H is an intermediate product of alcoholic fermentation (*C. A.*, 1, 362). E. J. C.

Amount of Glycogen in Differently-fed Yeast Cultures. WILHELM HENNEBERG.

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Biedermann's Zentr., 40, 277–8; *Z. Spiritusind.*, 33, 242; through *J. Chem. Soc.*, 100, II, 519.—Glycogen may occur both in abnormal and normal yeast. It is also stored up in pure sugar solns. and under conditions of insufficient, exclusive nutrition, so that its presence is no indication either of normal yeast or of a normal comp. of the nutritive soln. The production of peptone under some conditions is hindered by poisonous substances, such as organic NH_4 salts; $(NH_4)_2SO_4$ and, under some conditions, $CaSO_4$ are very unfavorable. Since yeast cells containing more than about 53% of protein usually contain little or no glycogen, it is probable that yeast cells in potato mashes, conc. mashes, and worts will not accumulate much glycogen.

E. J. C.

Theory of Disinfection. R. O. Herzog and R. Betzel. *Z. physiol. Chem.*, 67, 309–13; *J. Chem. Soc.*, 98, II, 882.—$AgNO_3$ is taken up by yeast, as in a process of adsorption, and $CHCl_3$ behaves similarly. A const. amt. of HCHO is fixed by yeast, independently of the conc. PhOH is not taken up. J. J. M.

The Theory of Disinfection. R. O. Herzog and R. Betzel. Chem. Inst., Karlsruhe. *Z. physiol Chem.*, 74, 221–41; cf. preceding abstr.—Pressed yeast was shaken with solutions of different conc. of $CHCl_3$, $AgNO_3$, $HgCl_2$, CH_2O and C_6H_5OH; after a given time each mixt. was centrifugalized, and in the soln. the amt. of disinfectant not adsorbed was detd. With $CHCl_3$, $AgNO_3$ and $HgCl_2$ the partition between cells and soln. agreed with the adsorption formula: $\log c = \log k + n \log b$. With C_6H_5OH it did so only for concs. below 1%; with CH_2O the formula was not followed at all. In all cases the process was reversible. Adsorption is only the 1st phase of disinfection. The law governing the killing of the cells must be quite different. In 5 hrs. 0.7% C_6H_5OH kills almost every cell; 0.5% hardly any. A. Hunter.

Notes on the Indole Reaction and Allied Phenomena. H. Seidelin and F. C. Lewis. Lister Inst. *J. Hyg.*, 11, 503–14; cf. *C. A.*, 5, 2395.—The results of the indole production by a large number of strains of *B. coli* are given. The indole production, however, was found not to be of any diagnostic value in the identification of strains. Indole was formed with tryptophan solns. by inoculating them with indole-producing organisms.

J. H. Mitchell.

The Fungi of Excreta. James Scott. *Leather World*, 4, 21–3.—S. has examd. the fungi of dog excreta and gives illustrations of magnified views of three kinds of fungi, (1) *Rhyparobins bookei*, (2) *Pilolobus crystallina*, and (3) *Isaria citrina*.

J. S. Rogers.

Formation of Glycogen in the Yeast Cell. Diana Bruschi. *Atti accad. Lincei*, 21, I, 54–60.—In a Milazzo must, noted for the ease with which it forms glycogen, containing 5 g. NH_4 tartrate per l. and kept at 25°, Et_2O and $CHCl_3$ did not impede the formation of glycogen if added gradually in doses insufficient to arrest fermentation, but they did prevent its formation completely when fermentation was arrested. Similar results were obtained with thymol and formalin. Bisulfite in doses of 60–80 mg. per l. markedly accelerates both processes, in doses of 100–300 mg. somewhat more slowly; in doses of 200–400 mg. it activates the fermentation and limits the formation of glycogen. If 1 mol. EtOH is added to 100 cc. of the liquid in full fermentation (but still free from glycogen), the latter is at once formed in such quantity that it completely fills the cells, and if the alc. is gradually added until fermentation is arrested, the glycogen remains undissolved for 10–15 days. If alc. is added at once in sufficient amt. to arrest fermentation, glycogen appears somewhat sooner than in the controls but only in minute grains and does not increase more rapidly than in the blanks. It is not, therefore, the conc. of the sugar present and absorbed, but the production of alc., which dets. the formation of glycogen in the yeast. In another series, to 100 cc.

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of must in full fermentation, must plus 3 cc. Et_2O, and must plus 0.1 mol. of alc. were added 0.1 mol. of various plasmolytic agents (mannitol, glycerol, saccharose, $CaCl_2$). It was found that even when the action of a narcotic or of a substance favoring the formation of glycogen (such as alc.) is combined with that of dehydrating agents, which ought to favor synthetic processes of condensation, the formation of glycogen cannot be sep. from full vital activity. The plasmolytic stage is sufficient to impede the formation of glycogen; when plasmolysis disappears, the power to form glycogen reappears. Even when the soln. is neutralized, the formation of glycogen cannot be produced in narcotized yeast cells when the fermentation is far advanced. A culture in full fermentation was then neutralized and enough alc. was added to strongly decrease the fermentation; no glycogen was formed, and when the fermentation had ceased (12–13 days), fresh must, containing 2 cc. Et_2O per 100 cc., was added; fermentation did not start again, the cells did not multiply, but they remained alive and after 2–3 days granules of glycogen appeared. Similar results were obtained by removing the liquid from a normal must in which glycogen had formed and redissolved and adding another culture (with 1 cc. of Et_2O) in which, by the addition of much saccharose (0.1 mol.) and alc. (0.1 mol.), an abundant formation of glycogen had been produced and its soln. impeded. After 24 hrs. glycogen appeared in the cells, although there was no fermentation or multiplication of the cells. The above facts indicate that glycogen is formed by the condensation of some intermediate product of fermentation, *i. e.*, it represents a partial reversion of a single link in the chain of processes in the digestion of the sugar. CHAS. A. ROUILLER.

Ammonia and Nitrates as a Source of Nitrogen for Certain Molds. G. E. RITTER. *Ber. botan. Ges.*, 29, 570–7.—Earlier expts. showed that *Aspergillus glaucus*, *Cladosporium herbarium*, and *Mucor racemosus* develop as well, and in some cases better, with NH_4 salts present than with nitrates. The objection had been raised that the decrease in the case of the nitrates was due to the alkalinity produced in the medium. It is now shown that while alkalinity is produced, this does not affect the development of the organism. Using $Ca(NO_3)$ and $(NH_4)H_2PO_4$, together with cane sugar, mannitol or glycerol, the best crops are obtained with $(NH_4)H_2PO_4$. It is also shown that the first step in the utilization of nitrates by the organism is a reduction of nitrate to nitrite. H. A. SPOEHR.

Prodigiosus Gelatinase. FRANZ VON GROBER. Breslau. *Biochem. Z.*, 38, 252–84.—The most active solns. of gelatinase were obtained from bouillon cultures, which were freed from the bacteria by centrifugalizing. The digestion of gelatin was conveniently and quantitatively followed by viscosity detns. The gelatinase is injured by acid or NaF. It is gradually destroyed by heat, but is not completely destroyed even after ½ hr. b. The presence of gelatin protects the enzyme from the influence of NaF or heat. For solns. containing 0.05 cc. of the enzyme soln. per 10 cc. of 5% gelatin the equation $K = lg(lg\eta)/t$ was found to hold, t representing the time of the reaction and η the viscosity of the soln. The reaction const. K was found to be nearly proportional to the conc. of enzyme. The increase in K caused by a rise of 10° in temp. was only 1.15–1.3, being less than that to be expected for a chem. reaction in accordance with the van't Hoff rule. D. D. VAN SLYKE.

Stimulating Actions. HUGO KÜHL. *Pharm. Zentralhalle*, 52, 1316–7.—A review of some recent observations demonstrates the stimulating action of very dil. solns. of poisonous antiseptics and disinfectants on the growth of microörganisms and plant life generally. M. I. W.

Fermentation and Assimilation Experiments with Yeasts (LINDER). 16. **Influence of Light on Fermentation** (LUBIMENKO, *et al*). 16.

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D. BOTANY.

CARL L. ALSBERG.

Investigation on the Disinfection of Grass Seeds. J. K. WILSON. *Centr. Bakt. Parasitenk. II Abt.*, 32, 201–2.—Seeds immersed in 70% alc. 105 min. are not steril; 2 min. in 1% $HgCl_2$ followed by 11 washings in steril water did not sterilize them; 80 min. in 10% HCHO sterilized some of them. Seeds placed in 95% alc. for 10 min. and then in 10% HCHO were steril only after 6 hrs. in HCHO, with 65% worthless. Seeds kept for 210 min. at 3 mm. pressure and then immersed for 30 min. in 10% HCHO were steril but did not grow. The diminished pressure itself did not prevent germination. H. J. CORPER.

Electromotive Phenomena in Plants. AUGUSTUS D. WALLER, *et al.* *Brit. Assoc. Rpts.*, 1910, 281–90; through *J. Chem. Soc.*, 100, II, 817.—This report deals with the rate of intoxication and temp., the evolution of HCN by laurel leaves, protoplasm and water, and a new method for the quant. estn. of HCN (cf. *C. A.*, 4, 2952). There is an appendix by Mrs. A. M. Waller on the blaze currents of laurel leaves in relation to their evolution of HCN. E. J. C.

Hydrocyanic Acid in the Ripening of Bitter and Sweet Almonds. G. DE. PLATO. *Ann. r. staz. chim. agrar. sperim. Roma*, 1910, II, 4, 117–27; through *J. Soc. Chem. Ind.*, 30, 1030.—During the ripening of bitter almonds, the contents of free and loosely bound (liberated by steam) HCN diminishes gradually, until finally none is present when ripening is complete. The combined (glucosidic) HCN increases during ripening until the cotyledons form, and then diminishes progressively with the hardening of the latter, but does not completely disappear. In sweet almonds, the content of loosely bound and glucosidic HCN diminishes as the cotyledons are forming, and has completely disappeared by the time the latter have become hardened. The proportion of protein N increases during ripening, amounting to 97% of the total N when ripening is complete. This is the reverse of what happens during germination, when the protein is converted into amygdalin. Amygdalin appears to be an intermediate product in the formation of proteins during the ripening of almonds. In sweet almonds, owing to the more active metabolism, the amygdalin is rapidly utilized and hence does not persist in the ripe seeds as in the bitter almonds. E. J. C.

The Mendelian Inheritance of Certain Chemical Characters in Maize. R. PEARL AND J. BARTLETT. Maine Agri. Expt. Sta., *Z. Induk. Abstammungs u. Vererbungslehre*, 6, 1–28.—Pure bred sweet corn was crossed with pure bred dent corn, both varieties having a definit chem. comp. The pollen was furnished by the "sweet" parent. In the 1st generation (F^1) all of the corn resembled the dent parent but analysis showed that the chem. characters were intermediate. The 2nd generation (F^2) produced 4 varieties as was expected according to Mendel's law, *i. e.*, yellow-starchy, white-starchy, yellow-sweet, and white-sweet. The results of the chem. analysis show that there is a definit inheritance of chem. characters according to Mendel's law, and that these characters exhibit the phenomena of dominant and recessive conditions and segregation. Those characters which were dominant are: high moisture, low N (or protein), low ash, low crude fiber, low pentosans, low sucrose, low dextrose, high starch, and low ether ext. (incomplete dominance). Assuming that the determiners of the "sweet" character, when present in the homozygous condition, tend to inhibit the expression of the dominant condition, it is shown that the chem. characters do not segregate as a whole, but that each character segregates as a unit character, independent of the other chem. properties. The bearing of these results on certain general problems is discussed. R. A. GORTNER.

Sideration or Bioculture? C. LUMIA. *Atti accad. Lincei*, 21, I, 140–5.—The

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term "sideration," and allied words, which might have answered at the time of Ville, is no longer appropriate in the light of our present knowledge in the fields of vegetable physiology and agricultural bacteriology, and "microbioculture" or simply "bioculture" is proposed for any cultural system intended to procure most of the N needed by the plants by rotation, with the aid of microörganisms which fix the free N.

CHAS. A. ROUILLER.

The Sugar Nodules of Nephrolepis hirtula, Presl. G. D. LIEBER. *Ber. botan. Ges.*, 29, 375–380.—The nodules contain 4.3% of dry matter, of which 1.6% is sugar. The sugar is a hexose or a mixt. of hexoses. H. A. SPOEHR.

The So-called Respiration of Finely Ground Seeds. LEONID IVANOV. *Ber. botan. Ges.*, 29, 563–70.—I. has previously shown the increased CO_2 production of powdered pea seeds brought about by the addition of Na_2HPO_4. In these expts. cell and bacterial activity was excluded by the use of thymol. From 10 g. pulverized pea seeds and 20 cc. H_2O in a stream of air, 284 mg. CO_2 and 224 mg. alc. were obtained. With zymin ext. or Na_2HPO_4 the amts. of CO_2, as well as of alc., were decidedly increased, from which it is concluded that the alc. fermentation in peas is brought about by an enzyme system containing a coenzyme. In many higher plants it has not been possible to demonstrate the presence of this enzyme, because those parts of the plants contain much water, and on killing the coenzyme diffuses, thus lowering the conc. thereof, and greatly decreasing the activity of the enzyme. It is shown that the amt. of O absorbed by powdered pea seeds is very small, and that the greater CO_2 formation brought about by Na_2HPO_4 is not accompanied by greater O absorption. If, then, according to the prevailing idea, O is utilized by the living organism in the oxidation of the intermediate and end products of alc. fermentation, this process must cease when the organism is killed, and the liberation of CO_2 from dead seeds cannot be ascribed to respiration. H. A. SPOEHR.

Changes in Plants Induced by Varying Amounts of Calcium and Magnesium. D. WARTHIADI. *Diss. Munich, Franz Grais*, 1911, 154 pp.—(I) An extensive study of the effect of varying proportions of Ca and Mg on cereals in sand and H_2O cultures, describing the various features of the resulting crops. (II) A study of the conditions of the cells of *Spyrogyra* and *Tradescantia* as well as the cereals grown in nutrient solns. lacking Ca and Mg. Lack of Mg seems to affect especially the chlorophyll app., while lack of Ca affects the cell nucleus and therefore the entire plant. The proportion of 1 : 1 of CaO : MgO is generally the best. H. A. SPOEHR.

The Influence of Tobacco Smoke on Plants. II. H. MOLISCH. *Sitzber. Kais. Wiss. Wien. Math. naturw. Klasse*, 120, I; cf. *C. A.*, 5, 2666.—The effect of the smoke on the mature plant was studied. On some plants as *Tradescantia guianensis*, *Selaginella maternsii* and others, the smoke retarded growth somewhat but in general was without effect. Other plants reacted in various ways: (*a*) Chemotactic movements: *e. g.*, leaves of *Boehmeria utiles* in a 4–7 l. jar with 1–3 puffs of cigar or cigaret smoke, in 24–48 hrs. turned down and finally curled up. (*b*) Abnormal lenticle formation: Many plants form large lenticles (0.5 cm.) from which guttation takes place. The latter fact points to large osmotic pressures brought about by the smoke. (*c*) Leaf abscission: Especially legumens show this effect in very short time. The same effect is brought about by illuminating gas, smoke from paper and wood, but only to a very slight extent by nicotine vapor. H. A. SPOEHR.

A New Theory of the Fixation of Atmospheric Nitrogen by Plants. E. HENRY. *Ann. Sc. Agron. France Etrang.*, [3] 1909, 102–30; *Bot. Cent.*, 117, 374.—Historical review with a criticism of the modern views of Jamieson, Zemplen and Roth.

H. A. SPOEHR.

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Increase of Sugar and Decrease of Acid in Pears from the Time of Formation to Maturity. G. RIVIÈRE AND G. BAILHACHE. *J. soc. nat. hort. France*, [4] 9, 284–9; *Bot. Cent.*, 117, 431.—In the course of development sugar increases in proportion to the acid. In fruits grown in paper bags both sugar and acids are higher than without. H. A. SPOEHR.

The Relative Accumulation of Sugar and Decrease of Acid in the Chasselas Doré Grapes. G. RIVIÈRE AND G. BAILHACHE. *J. soc. nat. hort. Frante*, [4] 9, 125–7; *Bot. Cent.*, 117, 431.—With the development of the fruit the relative sugar content increases and the acid decreases. H. A. SPOEHR.

The Chemistry of Polyporous frondus Fl. Dan. M. BAMBERGER AND A. LANDSIEDL. *Monatsh.*, 32, 641–2.—By treating the alc. ext. of this fungus with NH_3, a base is obtained which contains N; it is a white, amorphous powder and decomp. without m. on heating. It is insol. in H_2O, EtOH, Et_2O, $CHCl_3$, acetone, C_6H_6; sol. in mineral acids forming cryst. salts. HBr and HCl salts, clear, cubic plates. HCl and H_2SO_4 salts, brown above 300°. H. A. SPOEHR.

The Fermentive Oxidation of Oxalic Acid. W. ZALESKI AND A. REINHARD. Univ. Cracow. *Biochem. Z.*, 33, 449–55.—Wheat seeds contain an enzyme which catalyzes the oxidation of $H_2C_2O_4$ to CO_2. The oxidation depends upon the presence of atmospheric O, as it does not occur in an atm. of H. Killing the seeds with ether does not destroy the activity of the ferment. During the expts. the formation of a chromogen was observed, which apparently formed from the decomp. of a prochromogen. D. D. VAN SLYKE.

Colloidal Chlorophyll and the Condition of Chlorophyll in Plants. AMEDEO HERLITZKA. Turin. *Biochem. Z.*, 38, 321–30.—In the expressed juice of leaves the chlorophyll is in colloidal soln. and for this reason shows properties somewhat different from those of solns. of chlorophyll in organic solvents. Colloidal aq. solns. with properties similar to those of the expressed juice are prepared by adding H_2O to an acetone soln. of chlorophyll and driving off the acetone with a stream of air. Viewed by transmitted light the organic solns. appear fiery red, but the colloidal aq. solns. show only a green color. The coll. solns. are coagulated by $BaCl_2$, $MgSO_4$, or $(NH_4)_2SO_4$. The chlorophyll is carried down with coll. $Fe(OH)_3$ but is not absorbed by kaolin. It does not pass through the collodion ultra-filter of Bechold. In the elec. current it travels towards the anode. The absorption bands observed with the aq. solns. or suspensions are the same as those of the living leaf, but are detectibly different in location from those of the solns. in organic solvents. D. D. VAN SLYKE.

Influence of Enzymes on the Respiration of Plants. S. D. LVOV. *Bull. Acad. Sci. St. Petersburg*, 1911, (VI), 655–78; through *J. Chem. Soc.*, 100, II, 641.—Unboiled taka-diastase exerts a marked retarding influence on alc. fermentation by hefanol or zymin, but, after b., the enzyme stimulates the action of the zymase. On the respiration of the higher plants (*Vicia faba*, wheat seeds), taka-diastase exerts a stimulating action; this action is especially marked with living objects (*Vicia faba*), where anaerobiosis, according to Palladin, initially takes the form of alc. fermentation. Thus, it seems that where alc. fermentation proceeds alone and is not complicated by oxidation processes, taka-diastase exhibits its max. destructive acitivity, while, where the fermentation is only the initial phase, and is connected biologically with subsequent oxidation changes, the taka-diastase possesses its max. stimulating action. Merck's diastase, boiled or unboiled, produces effects opposit to, and of less magnitude than, those of taka-diastase. Emulsin, which produces the same effects in the boiled as in the unboiled condition, exerts a marked retarding action on alc. fermentation brought about by hefanol, and so proceeding apart from respiration. On the respiration occurring

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in dead organisms, and hence under abnormal conditions, emulsin exhibits a stimulating influence; but on the normal respiration of living higher plants (*Vicia faba*), emulsin has no action. E. J. C.

Oxidases and Essential Oils (BROOKS). 17. Phosphoric Acid Compounds in Seeds (LEWONIEWSKI). 15. Pot Experiments in Plant Physiology Studies (LOEW). 15.

E. NUTRITION.

PHILIP B. HAWK.

NORMAL.

Creatine and Creatinine Metabolism in Dogs during Feeding and Inanition with Especial Reference to the Function of the Liver. C. TOWLES AND C. VOEGTLIN. Johns Hopkins Univ. *J. Biol. Chem.*, 10, 479–97.—Expts. on dogs were carried out in which creatine and creatinine were fed or given subcutaneously to normal, fasting, and Eck-fistula dogs. About 25% of the creatine introduced into normally fed dogs, either subcutaneously or by mouth, was recovered as creatine in the urin. This indicates, in accord with Folin, that creatine should be regarded as a food. Of the 75% of creatine which does not reappear, about 5% is occasionally recovered as creatinine. When creatine is introduced (subcutaneously or *per os*) into Eck-fistula dogs less creatine (9%) is recovered than in the normal dog (23.5%). Administration of creatine to the Eck-fistula dog has the same effect upon creatinine excretion as in the normal dog (the creatinine elimination may be slightly increased, but this effect is not const.). The Eck-fistula dog reacts to the administration of creatinine and creatine in exactly the same way as the normal dog; hence it is concluded that the liver does not play an important part in creatine or creatinine metabolism. About 57% of the creatinine administered to fed dogs is recovered in the urin as such. Small amts. of creatine may occasionally appear in the urin after creatinine administration. Creatinine when administered *per os* or subcutaneously to starving dogs is recovered in much smaller amts. than in the case of the normal animal. Hence it is concluded that creatinine may be used as a food by the starving organism, just as creatine may be utilized by the well-fed organism. Neither creatine nor creatinine are true end-products of metabolism in the dog, the portion which appears in the urin being eliminated before destruction takes place. It is suggested that creatine hydrolysis in the organism is a reversible reaction. S. R. BENEDICT.

Reversion Phenomenon in the Action of Intestinal Juice on the Products of Casein Digestion. E. S. LONDON. St. Petersburg. *Z. physiol. Chem.*, 74, 301–4.—The chyme obtained from an intestinal fistula after casein feeding, if kept at 37°, first gelatinizes (12–36 hrs.), and then gradually liquefies again. The same occurs when the non-coagulable constituents of the chyme are digested with intestinal juice. The gelatinization is an enzyme reaction; its rapidity varies with the quantity of juice, and is increased by Na_2CO_3; it runs parallel with the cleavage of peptide groups, and differs therefore from the plastein reaction. A. HUNTER.

Chemistry of Digestion and Absorption in the Animal Body. XL. The Degree of Cleavage of Different Varieties of Protein in the Gastrointestinal Lumen. E. S. LONDON AND A. G. RABINOVICH. St. Petersburg. *Z. physiol. Chem.*, 74, 305–8.—Dogs with fistula of stomach, jejunum or ileum were fed coagulated ovalbumin, horse or dog flesh, dried serum proteins of horse or dog, casein, elastin, gelatin or gliadin. In boiled filtrates from the chyme delivered at intervals by the fistulae were detd. total, amide, and peptide N. Gastric digestion caused but a slight cleavage of peptide groups (av. 5%). In the jejunum about 20%, in the ileum 33% were hydrolyzed. Both in stomach and intestin cleavage was least with elastin, gelatin and gliadin, greatest

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with blood and flesh proteins. A difference between homologous and heterologous proteins was not observed. A. HUNTER.

Action of Intestinal Juice on the Products of Intestinal Digestion of Different Proteins. E. S. LONDON AND S. K. SOLOVYEV. St. Petersburg. *Z. physiol. Chem.*, 74, 309–11.—The chyme filtrates (cf. preceding abstr.) were digested with intestinal juice and amino N detd. from time to time by the method of Sorensen. Fresh juice was added till the amino N remained const. The degree of hydrolysis attained was greatest with dog plasma protein, least with elastin. In no case was it complete. From 11 to 43% of the N remained in peptide combination. A. HUNTER.

Chemistry of Digestion and Absorption in the Animal Body. XLI. The Digestion of Mixed Diet in Dog and Man. R. S. KRYM. St. Petersburg. *Z. physiol. Chem.*, 74, 312–7.—Four expts. were carried out on a dog with fistula in the 1st part of the jejunum. The fistula was opened for $^1/_4$ of each hr., the $^1/_4$ being different in each expt. Each meal consisted of 400 g. flesh, 50 g. starch, and 50 g. fat. For each g. food were produced about 4 cc. of digestive secretions. Absorption was liveliest in the 1st hr., decreased gradually thereafter, but increased again a little towards the end (11th hr.). In the 1st stage carbohydrates were most rapidly absorbed, in the 2nd fats. The N of the chyme was about 50% coagulable protein; the carbohydrate about 90% starch; the fat 77% neutral fat. A similar expt. on a man with fistula of the ileum showed that the mass of the digestive secretions was greater; nearly $^1/_3$ of the N of the chyme was coagulable, and $^1/_2$ of the starch unaltered. A. HUNTER.

The Laws of Digestion and Absorption. X. The Disappearance of a Glucose Solution from the Stomach. E. S. LONDON AND V. F. DAGAEV. *Z. physiol. Chem.*, 74, 318–21.—A 5% glucose soln. leaves the stomach at a rate which agrees with the formula: $x = k\sqrt{[M/(t + p)]}$, where M = the quantity of sugar soln., x = the amt. remaining in the stomach at a time t, $p = Mk^2/100^2$ and $k = 10.35$. After the greater part of the fluid has entered the duodenum (30–60 min.) the remainder is forwarded very rapidly. A. HUNTER.

The Laws of Digestion and Absorption. XI. Absorption of Proteins and Carbohydrates. E. S. LONDON AND O. E. GABRILOVICH. *Z. physiol. Chem.*, 74, 322–4.—By expts. on a dog with 2 intestinal fistulae 1 m. apart it is shown that the absorbed amt. (R) of protein or carbohydrate is directly, and the amt. (W_1) of H_2O inversely, proportional to the $\sqrt{}$ of the amt. introduced (Z and W resp.). $R = k\sqrt{Z}$; $W_1 = k\sqrt{W}$; k = 0.61 for carbohydrates, 0.511 for proteins. The amt. of juice secreted in the case of dextrin was detd. to be $N = k\sqrt{M}$; M = g. of dextrin, k = 0.1755. A. HUNTER.

The Specific Adaptation of the Digestive Juices. IV. The Relative Enzyme Content of the Intestinal Chyme on Different Diets. E. S. LONDON AND R. S. KRYM. *Z. physiol. Chem.*, 74, 325–7.—Dogs with jejunal fistula (in 1 case also without stomach) were fed various diets (meat, starch, fat, and mixed), and the digestive activities of the filtered chyme were detd. No sp. reaction of enzyme production to a given diet could be detected. On meat diet there was always a predominance of steapsin. A. HUNTER.

Digestive and Absorption Defects. E. S. LONDON, *et al.* St. Petersburg. *Z. physiol. Chem.*, 74, 328–59. **I. General Considerations and Methods.** E. S. LONDON. **II. Results of Partial or Total Removal of the Stomach.** V. F. DAGAEV.—Removal of the pyloric part is followed by retarded emptying, and delayed and diminished gastric secretion. The chem. processes remain normal on a flesh diet, with bread they approach the duodenal type and with pure carbohydrates and fats the jejunal type with const. alk. reaction. After total excision of the stomach the transformation

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of the food differs entirely from the normal. **III. Significance for Digestion of the Removal of Different Intestinal Segments.** B. D. STASSOV.—Removal of the ileum is followed by a vicarious increase in digestive and absorptive capacity of the upper intestin. After removal of the jejunum digestion of proteins, but not of carbohydrates, soon returns to the normal level; in relation to absorption the small intestin showed in this case no vicarious adaptation, compensation being effected probably by the large intestin. **IV. Digestion and Absorption after Interference with the Pancreas.** O. J. HOLMBERG.—Ligature of the pancreatic vessels causes hardly any, ligature of the ducts only a temporary, digestive disturbance. After extirpation of the gland protein digestion and absorption are diminished; there are no compensatory phenomena; sol. carbohydrates are less completely absorbed, and they disturb the absorption of proteins. A. HUNTER.

The Utilization of Different Amino Acids in the Organism of the Dog under Different Conditions. EMIL ABDERHALDEN, *et al. Z. physiol. Chem.*, 74, 481–504.—Fasting dogs were given glutamic acid, aspartic acid, asparagine, histidine, or Na NH_4 tartrate, with and without sucrose or pyruvic acid. The daily excretion of total NH_3 and amino N was followed. Details are given of a large no. of such expts. The results were not uniform, and yielded no definit evidence for a synthetic formation of amino acids. The amino acids were generally well utilized; very often the N fed was largely retained, and appeared only gradually in the urin. Histidine alone, when given without sucrose, produced a notable increase of amino N. A. HUNTER.

Relation of Nuclear Substance to Development. ERNST MASING. Dorpat. *Z. physiol. Chem.*, 75, 135–40; cf. *C. A.*, 5, 1611.—In the earlier stages rabbit embryos and rabbit livers contain relatively more nucleic acid than in the later stages of development. There is no evidence that the abs. quantity of nucleic acid increases with the development. G. M. MEYER.

The Gastric and Pancreatic Secretions of the Newborn. A. F. HESS. Dept. Health, N. Y. City. *Proc. Soc. Exp. Biol. Med.*, 9, 20–1.—HCl is present in the stomach of newborn infants whether they are examd. ½ or 20 hrs. after birth. The HCl varies from 0.5 to 7 cc., and is not in direct proportion to the age of the child. HCl was obtained within 1–2 min. after the catheter was introduced. H. regards it of reflex origin, due to the sucking of the tube. The longer the catheter is kept in the stomach, the more juice is obtained; in 60 min. 14 cc.; in 110 min., 17 cc. This gastric juice has an av. acidity of 50. Pepsin and rennin are also present in considerable amt. The duodenum was entered by means of a simple duodenal catheter and the contents aspirated. In the newborn infant there is very little to be aspirated compared to older infants. However, H. was able to find protease, lipase, and amylase in the duodenum before any food was ingested. Amylase was found with least regularity. Bile was not found in these tests. Frequently no secretion at all was obtained. About 35 tests were made. V. C. MEYERS.

Effects of Nutrition with Maize. III. Action of the Pancreatic Juice of the Dog on Zein and Gliadin. S. BAGLIONI. Univ. Rome. *Atti accad. Lincei*, 20, II, 36–9; through *Chem. Zentr.*, 1911, II, 1046; cf. *C. A.*, 5, 1137.—Zein offers greater resistance than gliadin to the action of the pancreatic juice of the dog. CHAS. A. ROUILLER.

Rice as a Food. Nitrogen and Phosphorus Metabolism during Nourishment with Rice and other Chiefly Vegetable Foods. HANS ARON AND FELIX HOCSON. Manila. *Biochem. Z.*, 32, 189–203.—From expts. with prisoners and students, A. and H. conclude that it is almost impossible for a man under usual conditions to eat enough rice to maintain N equil. when rice is the sole source of protein in the food. When polished rice is fed the P balance also remains negative. Only about 65% of rice pro-

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tein is utilized. With animal or vegetable foods rich in protein, rice, especially when not polished, is valuable as a conc. food. When rice and other vegetables are consumed 12 g. of protein N per 50 kg. body wt. are required. When the rice is mixed with meat, so that at least $^1/_3$ of the protein is of animal origin, 10 g. of N suffice.

D. D. VAN SLYKE.

The Catabolism of Histidine. H. D. DAKIN AND A. J. WAKEMAN. Herter Lab., N. Y. *J. Biol. Chem.*, 10, 499–502.—The authors have previously shown that the acetoacetic acid produced in the organism from tyrosine and from phenylalanine is derived from 4 adjacent C atoms, 2 from the side chain and 2 from the nucleus. Since histidine contains 4 adjacent C atoms, 2 of which are in the side chain, and 2 in the nucleus, it is suggested that this compd. may undergo a similar transformation in the organism, with formation of acetoacetic acid. To test this hypothesis dog livers were perfused with blood to which had been added histidine carbonate, and the acetoacetic acid content detd. The results are not regarded as conclusive, but are believed to show that a slight increase in acetoacetic acid of the blood follows addition of histidine carbonate. The work is being continued. S. R. BENEDICT.

Free Amino Acids in the Intestinal Contents of Certain Mammals. EMIL ABDERHALDEN. *Z. physiol. Chem.*, 74, 436–44.—From the intestinal contents of 106 dogs there were isolated 110 g. monoamino acids; from 50 pigs, 145 g.; from 20 oxen, 225 g.; and from 10 horses, 180 g. These were obtained by direct crystn. out of not aq. exts. after treatment with phosphotungstic acid. They are therefore minimal values, yet represent about 20% of the total N of the chyme. Further yields were sepd. by pptn. with alc., and by the ester method. Leucin, valine, glycine, and glutamic acid were isolated in large amts. Aspartic acid and alanine were also identified. Tyrosine was present only in traces. A. HUNTER.

ABNORMAL.

Interrelation of the Ammonia and Carbon Dioxide Content of the Blood. RALPH HOPKINS AND W. DENIS. Tulane Univ. *J. Biol. Chem.*, 10, 407–15.—Asphyxiation of unfed animals (dogs) by increasing the CO_2 content of the blood causes a decrease in the NH_3 content of this fluid. Artificial respiration of unfed dogs causing a decrease in CO_2 content of the blood causes an increase in the NH_3. Inhalation of O by unfed dogs increases NH_3 in the blood, as does also treatment of the animal with curare. Low blood pressure from decreased oxidation, decreases the NH_3 content of the blood in unfed dogs. Asphyxiation of dogs in full digestion gives an increase of NH_3 instead of a diminution as in starving dogs. S. R. BENEDICT.

Fasting Studies. V. The Influence of an Excessive Water Ingestion on a Dog after a Prolonged Fast. PAUL E. HOWE, H. A. MATTILL AND P. B. HAWK. Univ. Ill. *J. Biol. Chem.*, 10, 417–32.—A dog of 26.3 kg. wt. was subjected to a 59-day fast receiving each day 700 cc. H_2O. On the 60th day and for the 3 following days the H_2O ingestion was increased 200%, and then the former H_2O level was resumed. The increased H_2O ingestion brought about an increase in total N elimination of 77.5% on the first day, after which it rapidly fell to the former value. NH_3 N was increased by the high H_2O ingestion, while the creatinine output was increased during the first day of this period. For a period of 8 days preceding the H_2O period the urin of the dog had been practically free from creatine. With the inception of the high H_2O intake creatine appeared in the urin and continued throughout the entire period. Allantoin elimination was increased during the H_2O period, and a more than compensating decrease in elimination of purine N took place. It is argued that the excessive H_2O ingestion has a distinct stimulating effect on protein catabolism, and that its effects are not due to a flushing-out of the tissues. S. R. BENEDICT.

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Lipolytic Power of Dog Blood and Serum under different Conditions. EMIL ABDERHALDEN AND PETER RONA. *Z. physiol. Chem.*, 75, 30–7.—Dogs after a fasting period were fed excessive amts. of fat (rapeseed oil and lamb fat) and the lipolytic power of the blood and serum of the animals detd. by the Rona and Michaelis method (variation of the drop count due to change in surface tension) before and after the administration of the fat. In all instances there was noted an increase in the lipolytic power of the blood and particularly so of the serum. G. M. MEYER.

Ammonia Content of the Urin and its Relation to Gastric Secretion. S. A. GAMMELTOFT. Copenhagen. *Z. physiol. Chem.*, 75, 57–70.—NH_3 detns. on urins obtained from normal and diseased persons to establish the cause of the diurnal variation of NH_3 in the urin. G. M. MEYER.

Nitrogen and Sodium Chloride Excretion in Experimental Uranium Nephritis. H. O. MOSENTHAL. Columbia Univ. *Proc. Soc. Exp. Biol. Med.*, 9, 22.—In dogs suffering from nephritis produced by the subcutaneous injection of $UO_2(NO_3)_2$, the N secreted by the small intestin is somewhat diminished; the fecal N remains approx. unchanged; the urinary N is not diminished even when the diet demands an excretion of 1 g. of urinary N per kg. of body wt.; in some cases the urinary N is increased, though the source of this excess has not been ascertained. The NaCl excretion keeps pace with the intake even when considerable quantities are added to the food. V. C. MYERS.

Influence of Beet Leaves on the Production of Milk (VIVIER). 12. Nutritive Value of Bread (HILL), (EDIE, SIMPSON), (WATSON). 12. Bread Question, (WALLACE). 12. Rations for Cows (ECKLES). 12.

F. PHYSIOLOGY.

ANDREW HUNTER.

The Physiology of Lymph. XVIII. Relation of the Pancreas to the Lipase of the Blood and Lymphs. C. L. VON HESS. Univ. Chicago. *J. Biol. Chem.*, 10, 381–98.—Extirpation of the pancreas in dogs does not alter the conc. of lipase in the serum. After pancreatectomy rabbits may show a temporary fall in conc. of lipase in the serum, which soon returns to normal. Ligation of all pancreatic ducts in dogs, or atrophy of the pancreas in rabbits, produces no change in lipase content of the serum. Ligation of the renal arteries either with or without ligation of the pancreatic ducts has no marked or const. effect on the lipase content of the serum. Bile salts do not activate the serum lipase. The lipase content of serum seems to have little relationship to activity of pancreas or thyroid. S. R. BENEDICT.

The Physiology of the Lymph. XVII. The Supposed Presence of the Secretion of the Hypophysis in the Cerebrospinal Fluid. A. J. CARLSON AND L. M. MARTIN. Univ. Chicago. *Am. J. Physiol.*, 29, 64–75.—The authors criticize the expts. of Cushing and Goetch (*C. A.*, 5, 517). C. and M. conclude from their trials by injecting the cerebrospinal fluid of normal dogs intravenously into dogs that there is no evidence that the secretion of the gland is discharged into the cerebrospinal fluid. On the contrary when adequate tests have been worked out for the presence of the hypophysis secretion in the body fluids, C. and M. expect that its distribution will prove to be similar to that of all the other internal secretions so far studied, the conc. being greatest in the blood and least in the cerebrospinal fluid. J. F. LYMAN.

The Reaction of the Vasomotor Center to Asphyxia. TORALD SOLLMAN AND J. D. PILCHER. Western Reserve Univ. *Am. J. Physiol.* 29, 100–7.—A report of results obtained by the method of the authors for studying the reactions of the vasomotor center (*Am. J. Physiol.*, 26, 233). Asphyxia causes a marked stimulation of the center,

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which becomes extremely powerful as the pressure falls, and may persist for a few min. after death. The stimulation is not caused by a lack of O, but is caused presumably by the accumulation of CO_2 and does not occur if such accumulation is prevented. J. F. LYMAN.

Concretions Obtained from an Udder Cyst of a Mare. ARTHUR SCHEUNERT AND WALTHER GRIMM. Dresden. *Z. physiol. Chem.*, 76, 322–9.—Analysis of an udder concretion of unusual size which slowly formed at seat of injury 14 yrs. before. For the fresh concretion; H_2O = 69.26, $CHCl_3$-sol. 24.22 (consisting of fat 13.76, cholesterol 9.72, lecithin 0.74), protein 4.57, ash 1.73%. For the dried concretion: $CHCl_3$-sol. 78.81 (consisting of fat 44.77, cholesterol 31.63, lecithin 2.41), protein 14.86, ash 5.62%. G. M. MEYER.

The Possible Vicarious Relationship between the Pituitary and Thyroid Glands. S. SIMPSON AND A. HUNTER. Cornell Univ., Ithaca. *Quart. J. Exp. Physiol.*, 4, 257–72; see *C. A.*, 5, 1939. V. C. MYERS.

Diastases. IX. The Influence of the Serum, Lymph, and of the Organ Juices on the Action of Diastase. J. WOHLGEMUTH. Univ. Berlin. *Biochem. Z.*, 33, 303–14.—The serum, lymph, and the expressed juices of muscle, kidney, and liver contain a substance capable of accelerating the action of diastase. The activator is stable against b., and is sol. in alc. It activates not only the diastase of pancreatic juice, but also that obtained from the liver, kidneys, and muscles. D. D. VAN SLYKE.

Investigations on the Inner Secretions of the Ovaries. G. SCHICKELE. Univ. Strassburg. *Biochem. Z.*, 38, 169–213.—The ovaries, uterus, and menstrual blood contain antithrombin and also substances which exert a powerful depressant action on the blood pressure and cause expansion of the blood vessels. The active substances cannot be extracted from the organs with H_2O or NaCl soln., but are found in the press juice. The depressor substance is sol. in alc. and apparently is a lipoid. The organs tested were those of horses and cattle, and human uteri obtained in operations. The blood pressure effects were tested chiefly on rabbits, and the vessel-expanding effect on the eye of the rabbit. The exts. were often toxic, causing convulsions and even death. The depressor substance is found in the organs of immature animals, but the uterus of a woman in menopause gave negative results. The depressor apparently originates in the cells from which the ripe sexual cell are formed. D. D. VAN SLYKE.

The Inner Secretion of the Placenta. G. SCHICKELE. Univ. Strassburg. *Biochem. Z.*, 38, 214–25.—The placenta contains a substance which is obtained in the press juice and alc. ext., and which exerts a depressant effect on the blood pressure of rabbits. It contains no antithrombin. The blood from the navel cord also contains a depressor but no antithrombin. D. D. VAN SLYKE.

The Glucose of the Blood Serum. LEONIDAS DOXIADES. Breslau. *Biochem. Z.*, 38, 306–9.—When 5–30 g. of glucose were dissolved in 100 cc. of pig serum and the soln. kept at 37°, the rotation gradually increased to a measurable extent and the reducing power for Fehling soln. diminished. This indicates the possibility of the formation of a disaccharide of higher rotation than glucose. An osazone was isolated which gave on analysis figures approaching those of maltosazone. D. D. VAN SLYKE.

Thyroids and Enzymic Processes. A. YUSHTSHENKO. St. Petersburg. *Z. physiol. Chem.*, 75, 141–68.—Extirpation of the thyroids in very young dogs causes a diminution of catalase and nuclease in the blood and other organs. The same result as well as a lowering of antitryptic property of serum was noted in rabbits. The

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administration of thyroid to animals has the opposit effect, besides the production in the serum of an antibody-thyreotoxin. G. M. MEYER.

G. PATHOLOGY.

H. GIDEON WELLS.

Cholesterol-ester Fatty Changes. MAX VERSÉ. Univ. Leipzig. *Beitr. Path. Anat.* (*Ziegler*), 52, 1–15.—V. examined the fat in numerous normal (man and animal) and pathological (man) individuals and found doubly refractive substances generally distributed. In the ordinary fat tissues they were found mixed with the neutral fats, this also being the case in pathologic cells. It is not pathognomonic of degenerative changes. In degenerative processes pure cholesterol may appear along with fatty acids. Under certain conditions, especially when lymph stasis plays a part, lipoids are accumulated in the mesentery around the glands and doubly refractive substances appear in the fat cells themselves, as also in the interstitial tissue. H. J. CORPER.

New Experimental Investigations on the Pathogenesis of Rachitis. W. DIBBELT. Univ. Tübingen. *Deut. med. Wochschr.*, 38, 316–8.—D. increased resorption of bone substance (increasing the elimination of lime salts) in a dog 5 weeks old by administering Na phosphate with the food, and as a result of this and previous observations believes rachitis a disease of Ca metabolism. In this expt. the hemoglobin was also only 55% while the red (4,840,000) and white cells (8125) were unaltered. H. J. C.

Trade Argyria. FRZ. KOELSCH. München. *Münch. med. Wochschr.*, 59, 304–6.—K. reports 2 cases of trade argyria in women. A mixed sample of the dust from the room in which they worked analyzed 0.03% Ag. The fingers of the women at the close of their work contained barely a trace of Ag. H. J. CORPER.

A New Case of Alcaptonuria with Ochronosis. VALDEMAR POULSEN. Kopenhagen. *Münch. med. Wochschr.*, 59, 364–5.—P. reports another case of ochronosis in a 23-year old baker with alcaptonuria (2400 cc. of urin containing about 2 g. homogentisic acid), and still believes that ochronosis depends upon alcaptonuria or a long-extended use of phenol poultices, and that the pigment formation results from the formation of melanin (probably by enzyme action, tyrosinase) from the circulating homogentisic acid and tyrosine. H. J. CORPER.

Incomplete Fixation of Complement and Amboceptor. J. O. W. BARRATT. Univ. Liverpool. *J. Path. Bact.*, 16, 362–79; *Proc. Roy. Soc., London*, (*B*) 84, 277–9.—The proportion of complement and amboceptor present in normal serum may be varied without destroying the hemolytic power, provided that when the complement is increased the amboceptor is diminished, and *vice versa*. In the fractional withdrawal of complement and amboceptor by the addition of rabbit erythrocytes as antigen, the complement and amboceptor withdrawn are in the same relative amts. as in normal serum. If the complement and amboceptor exist in other than normal proportions in the serum they will be withdrawn in the proportions in which they exist.
J. H. MITCHELL.

Hemolysin Produced by Pathogenic Streptococci, and the Existence of Antihemolysin in the Sera of Normal and Immunized Animals. J. W. M'LEOD. Glasgow Univ. *J. Path. Bact.*, 16, 321–50.—Using a peptone bouillon which was distinctly alk. to litmus, and contained 20% horse serum, which had previously been heated to 56° for 1 hr., the author was able to obtain constantly an actively hemolytic culture, of which the m. l. d. varied between 0.02 cc. and 0.0075 cc., depending on the freshness of the serum. The amt. of hemolysin is approx. proportional to the extent of active and protracted growth. Streptolysin is destroyed by exposure to 50–55° for 30 min., thus resembling tetanolysin, staphylolysin and magatheriolysin. It deteriorates rapidly

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with incubation at 37°. There is no evidence of the formation of hemolysoid as a result of the artificial or spontaneous weakening of the hemolysin. In 4 species—man, horse, rabbit and guinea pig—there is very little difference in the amt. of antihemolysin in the sera of the different individuals of the same species. The normal antihemolysin to streptolysin in horse serum is apparently not globulin or albumin, but possibly lipoid. There is no trace of immune antihemolysin in the sera of rabbits or guinea pigs which have been treated with large injections of streptolysin during a period of 7 or 8 weeks, nor is any found in the sera of men who have suffered from infections due to hemolytic streptococci. Virulence and hemolytic power are closely associated among pathogenic streptococci. J. H. MITCHELL.

The Seat of Action in Tetany after Parathyroidectomy. W. G. MACCALLUM. Columbia Univ. *Proc. Soc. Exp. Biol. Med.*, 9, 23–4.—If the nerves of a limb be cut during tetany, their elec. excitability remains the same as that of the intact nerves on the opposit side. Further, if the nerves be cut before the development of tetany, they become hyperexcitable to an extent which equals that of the intact nerve on the opposit side. Transfusion of the blood of an animal in tetany into the vessels of a normal animal has not succeeded in producing a characteristic tetany, nor even a marked change in the excitability of the nerve. This is ascribed partly to inadequate technic and partly to the action of the normal dog parathyroids. If the leg of a normal dog be isolated, with the exception of the nerves which remain in intact connection with the spinal cord, and if the vessels be anastomosed with those of a dog in tetany, so that the peripheral portions of the normal legs are bathed with tetany blood, the nerves of that leg assume the characteristic hyperexcitability of tetany, and twitchings may even occur. The expts. indicate that the hyperexcitability is peripheral and is dependent upon some change in the character of the blood. V. C. MYERS.

The Mechanism of Complement Deviation in Antiprotein Sera. EDMUND WEIL AND WILHELM SPAET. Prague. *Biochem. Z.*, 33, 63–72.—The authors report expts. indicating that the binding of the immune body is not a prerequisit for the sp. reaction, but is rather a secondary phenomenon occurring in the course of the reaction. D. D. VAN SLYKE.

Calcium Absorption and Calcification. MASAHIKO TANAKA. Strassburg. *Biochem. Z.*, 38, 285–93.—Various Ca salts in doses up to 6 g. were injected into the body cavities or veins of rabbits. Death resulted after a few days or weeks. Calcifications were found in various organs of the body, both near and remote from the places of the injections. The remote, or secondary deposits occurred with especial frequency in the striated muscles. In the kidneys the deposit had the character of a secretory calcification. The chem. nature of the Ca salts injected, some of which were insol., some sol., had no influence on the nature of the calcification. The inflammation and formation of giant cells about the calcifications indicate a reactive inflammation. The ecchymoses in the mucosa of the stomach resemble the so-called peptic erosions. D. D. VAN SLYKE.

Chemical and Biological Properties of Dysentery Bacilli. WINTER. Univ. Rostock. *Z. Hyg.*, 70, 273–303.—Thirty-five strains of dysentery bacilli were found const. in their chem. and biological properties. Both the pseudo-dysentery strains and the true Kruse bacillus decomposed maltose easily, and lactose to a less degree. Among the metabolic products found in the media after sugar decomp. were CO_2, alc., and fatty acids, especially butyric acid. E. R. LONG.

H. PHARMACOLOGY.

ALFRED N. RICHARDS.

A Difference in the Action of Morphine and Opium on the Intestins. ERWIN

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Popper. Vienna. *Deut. med. Wochschr.*, 38, 308–9.—In extirpated intestins of rabbit, dog and cat, morphine acts the same on the circular and longitudinal muscles of the small and large intestin, shortening (tonus increase) and magnifying the pendulum waves as first described by Pal. Opium and pantopon act upon the circular muscles like morphine, but lengthen the longitudinal muscle (decreased tonus) without suspending the pendulum movements. H. J. Corper.

The Results of Combined Salvarsan-Mercury Treatment in Syphilis. W. Schotz. Königsberg. *Deut. Med. Wochschr.*, 38, 309–13. H. J. Corper.

The Theory of the Action of Salvarsan and Arsenophenylglycine. Jul. Iversen. *Münch. med. Wochschr.*, 59, 295–6.—Arsenophenylglycine and salvarsan act entirely differently upon recurrent fever, the former having no effect even in double 0.5 g. doses (10 cases), while the latter causes complete sterilization in 0.3–0.4 g. doses. I. thinks the action of salvarsan, therefore, depends upon the hydroxy and amino groups, or on the favorable combination of these 2, and not upon the As. H. J. Corper.

Toxic Action of Methyl Alcohol. Louis Lewin. *Apoth. Ztg.*, 26, 54–5; through *J. Chem. Soc.*, 100, II, 753.—L. gives many instances of the extraordinary toxicity of MeOH which follows both inhalation and ingestion through the stomach. Of 63 hen eggs, after injection of EtOH, 11.11% did not develop at all, 34.93% developed monstrosities; after injection of MeOH, 11.11% did not develop, whereas 65.09% gave rise to monstrosities. E. J. C.

Anesthetics. Augustus D. Waller, Frederick W. Hewitt, Blumfeld, John A. Gardner and George A. Buckmaster. *Brit. Assoc. Rpt.*, 1910, 268–81; *J. Chem. Soc.*, 100, II, 814.—This report deals with the principles of anesthesia by ether vapor (Waller), the rate of assumption of $CHCl_3$ by the blood and the % of $CHCl_3$ found in the blood of cats at the asphyxial point, using different strengths of $CHCl_3$-air mixt. (Buckmaster and Gardner), and the influence of O on the anesthetic effect of $CHCl_3$ (Hewitt and Waller). E. J. C.

Artificial Pyrexia Produced by Tetrahydro-β-naphthylamine Hydrochloride. Adam Black. *Proc. Roy. Soc. Edinburgh*, 31, 333–41; through *J. Chem. Soc.*, 100, II, 636.—This drug induces a high temp. in rabbits and dogs by acting on the nervous system; its action is antagonized by ether. The rise of temp. is probably due to decreased heat elimination. The change in nitrogenous metabolism is very small compared with that produced by diphtheria-toxin. It is probably the action of toxins on the tissues, and not the high temp., which modifies protein metabolism. E. J. C.

The Action of Radium Emanation on some of the Main Constituents of Normal Blood. Helen Chambers and Sidney Russ. *Proc. Roy. Soc. London (B)*, 84, 124–36; through *J. Chem. Soc.*, 100, II, 809.—Red corpuscles are hemolyzed by α-rays, and oxyhemoglobin is converted into methemoglobin. Leucocytes undergo marked degenerative changes when subjected to α-rays. During clotting, the leucocytes appear to move away from the α-radiated region. This is attributed to changes in the surface tension of blood serum when radiated. The sp. properties of opsonin and hemolytic complement are lost when serum is exposed to α-rays. The progressive changes caused by these rays indicate that opsonin and complement are not identical. The β- and γ-rays yielded negative results in analogous expts. E. J. C.

Compounds of the Aromatic Series as Cholagogs. M. Petrov. St. Petersburg. *Z. physiol. Chem.*, 74, 429–35.—Expts. on 2 dogs with fistulas of gall bladder and stomach showed that bile secretion is stimulated by NaOBz, Na salicylate, thymol, phenol, menthol, and guaiacol, all compds. which conjugate with H_2SO_4.

A. Hunter.

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Behavior of Iodoaliphatic Derivatives of Cholesterol in the Dog Body. EMIL ABDERHALDEN AND EMIL GRESSEL. *Z. physiol. Chem.*, 74, 472–80.—*α-Iodopropionyl chloride* was obtained by the action of $SOCl_2$ on $CH_2CH_2ICO_2H$; and in a similar way were prepared *β-iodopropionyl chloride* and *diiodoelaidyl chloride*. Each of these, when treated with an equiv. amt. of cholesterol in $CHCl_3$, forms a cryst. addition product, and then on b. 6 hrs. yields the corresponding deriv. described below; it is sepd. in each case by the addition of MeOH. *α-Iodopropionylcholesterol*, $C_{30}H_{49}O_2I$, needles, m. 100–15°; loses I at 197°; yield, 37%. *β-Iodopropionylcholesterol*, $C_{30}H_{49}O_2I$, plates, m. 85–100°; decomp. 260° without losing I; yield, 50%. *Diiodoelaidylcholesterol*, $C_{45}H_{78}O_2I_2$, oily drops or amorphous solid, m. 42–90°; loses I at 210°; yield, 53%. All these derivs. were administered to dogs by mouth and subcutaneously. Only about $^1/_3$ was absorbed from the intestin. A considerable amt. of the absorbed I was retained. The elimination of I in the urin lasted 4–5 days after oral administration; after injection it was very gradual, and intermittent. A. HUNTER.

The Action of Sodium and Calcium upon the Direct and Indirect Irritability of the Muscles of the Frog. D. R. JOSEPH AND S. J. MELTZER. Rockefeller Inst. for Med. Research. *Am. J. Physiol.*, 29, 1–31.—When the blood vessels of the gastrocnemius muscle of the frog are perfused with 0.1 mol. NaCl soln. the irritability of the motor nerve endings is abolished within a short time (10 min. to 1 hr.). The direct irritability of the muscle is reduced, only in a moderate degree. Subsequent irrigation with 0.1 mol. $CaCl_2$ restores both kinds of irritability. Bathing of motor nerve trunks with 0.1 mol. NaCl does not affect their cond. Primary perfusion of 0.1 mol. $CaCl_2$ through the gastrocnemius abolishes the direct and indirect irritability more promptly than does irrigation with the NaCl. Direct irritability is affected by this treatment nearly as much as the indirect but only at low temps. Bathing the nerve trunks in 0.1 mol. $CaCl_2$ soln. for 2–3 hrs. abolishes their cond. The lost irritability of muscle, nerve endings and nerve trunks is rapidly restored by irrigation (or bathing) with 0.1 mol. NaCl. Thus, Ca, in its primary action, is in the same class with Na, K, and Mg which exert a curare-like action upon the nerve endings. A discussion of the action of Na and Ca on muscle and nerve is included. J. F. LYMAN.

The Influence of Colloids on Diuresis. F. P. KNOWLTON. Cambridge. *J. Physiol.*, 43, 219–31.—Colloids which exercize osmotic pressures inhibit diuresis when injected intravenously into rabbits. The diuresis may be caused by injections of Ringer soln. or of hypertonic solns. of NaCl. In both cases the diuresis may be inhibited by injections of gelatin which acts mechanically by increasing the osmotic pressure of the colloids. The effect of the gelatin on viscosity of the blood, on rate of flow through the kidney capillaries, or on the secreting cells themselves will not account for the results obtained. Colloids exerting no osmotic pressure are without action. J. F. LYMAN.

Strychnine Reversal. A. G. W. OWEN AND C. S. SHERRINGTON. Univ. Liverpool. *J. Physiol.*, 43, 232–41.—Strychnine converts an inhibitory into an excitatory reflex in the case of the knee flexor muscle as well as in the case of the extensor. J. F. LYMAN.

The Effect on Blood Pressure of Organ Extracts. J. L. MILLER AND E. M. MILLER. Univ. Chicago. *J. Physiol.*, 43, 242–6.—Varying results of previous workers have doubtless been due to differences in methods used. When fresh organs are extd. with abs. alc., evapd. and redissolved in normal saline, the exts. of liver, kidney, pancreas, spleen, parathyroid, thyroid, thymus, prostate, ovary, testis and anterior lobe of the hypophysis are without effect on blood pressure. The alc. exts. of nervous tissue contained a depressor substance. The alc.-exhausted organs extd. with normal saline

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gave solns. which produced depressor effects in every case except that of the spleen, in which a pressor action was noted. J. F. LYMAN.

The Innervation of the Coronary Vessels. T. G. BRODIE AND W. C. CULLIS. London School of Med. for Women. *J. Physiol.*, 43, 313–24.—Adrenaline solns. in proper amts. perfused through the coronary vessels caused vaso-constriction. In larger amts. vaso-dilatation may occur. The coronary vessels appear to possess both vaso-constrictors and vasodilators from the sympathetic nervous system, the former being more sensitive to adrenaline. A secondary vaso-dilatation may take place due to the action of heart metabolites (CO_2) on the blood vessels and produced excessively as a result of the action of the drug on the heart itself. J. F. LYMAN.

The Action of Homologous Alcohols and Aldehydes on the Tortoise Heart. H. M. VERNON. Oxford. *J. Physiol.*, 43, 325–42.—A continuation of previous work (*C. A.*, 5, 1936). The toxicity of the alcs. increases with mol. wt., that of isoamyl alc. being 23 times greater than that of MeOH. With the aldehyde there is no relation between mol. wt. and toxicity. The relative toxicities are: Propyl aldehyde 1.0, CH_3CHO 1.2, isobutyl aldehyde 1.8, HCHO 40. J. F. LYMAN.

Further Observations on the Tolerance of Gases by the Circulatory Apparatus. J. P. ATKINSON AND C. B. FITZPATRICK. Dept. Health, N. Y. City. *Proc. Soc. Exp. Biol. Med.*, 9, 25–6.—Expts. are reported on the tolerance for CO_2, N, O, H and H_2S when injected in varying amts. into the blood stream of dogs. V. C. MYERS.

The Destruction of Adrenaline by Spinal Fluid. S. J. MELTZER. Rockefeller Inst. *Proc. Soc. Exp. Biol. Med.*, 9, 27–8.—That neither blood nor serum is capable of destroying adrenal ext. has been observed by several investigators. Spinal fluid is capable, however, of destroying adrenaline. This was found to be the case in a large number of spinal fluids obtained and seems to be a physiological property. Pathologically, it is worthy of note that the spinal fluid from poliomyelitis seems to destroy adrenaline definitly more readily than that from tuberculous meningitis. The presence of adrenaline was studied by its dilating action upon the frog pupil, and its action on blood pressure. V. C. MYERS.

The Convulsant Effect of the Removal of the Heart upon Frogs which had Injections of Morphine. T. S. GITHENS AND S. J. MELTZER. Rockefeller Inst. *Proc. Soc. Exp. Biol. Med.*, 9, 30–1.—It has previously been shown (cf. Meltzer, *C. A.*, 5, 2866) that substances which are capable of causing a definit biological reaction in frogs, cause the reaction when injected after the removal of the heart, and that some substances, like morphine and acid fuchsin, are even more effective after the removal of the heart. It has now been found that while morphine frogs (dose, 0.1–0.5 mg. per g. of frog) which are kept with hearts intact, remain normal, all frogs which received proper doses of morphine and subsequently had their hearts removed, developed tetanic convulsions, which were frequently very violent. With doses of 0.25 mg. per g. of frog, convulsions developed in practically every case, no matter how soon or how late the heart was removed. V. C. MYERS.

Toxic Action of Quinine on the Nerve Centers. MARCO ALMAGIA. Univ. Rome. *Atti accad. Lincei*, 20, I, 592–3; through *Chem. Zentr.*, 1911, II, 376.—The view that quinine *in vitro* and in the body acts like tetanus toxin, snake poison or strychnine is confirmed. Animals can stand larger amts. of quinine which has been acted upon for a long time by brain matter. Thus, the lethal dose for a dog of 5–7 kg. is 1 g.; death ensues in 1–3 hrs. After the above treatment of the quinine, 2–2.5 g. were administered to each of 5 dogs of about 5 kg. without causing death. Lecithin has the same action as brain matter. Hence there is a certain affinity between quinine and brain matter, and lecithin plays some role in this. CHAS. A. ROUILLER.

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The Pharmacology of Organic Mercury Compounds. FRANZ MUELLER, WALTER SCHOELLER AND WALTHER SCHRAUTH. Univ. Berlin. *Biochem. Z.*, 33, 381–412.—Organic compds. of Hg fall into 2 groups in regard to their toxicity: (1) compds. in which the Hg is linked to 2 C atoms; (2) Hg linked to 1 C atom and 1 O atom. To group 1, which is but slightly toxic, belong $NaO_2CH_2CH_2$—Hg—$CH_2CH_2CO_2Na$ and $NaO_2C_6H_4$—Hg—$C_6H_4CO_2Na$, of which doses containing 140–170 mg. of Hg per kg. of animal are required to kill cats within 3–4 days. Group 2 consisting of compds. of the general const. OH—Hg—C—R—CO_2Na, kills in doses of 30 mg. or less per kg. CN—Hg—$C_6H_4CO_2Na$ and NaS_2O_3—Hg—$C_6H_4CO_2Na$ also belong to this class in toxicity. The toxicity is the greater the more readily the Hg can be split off from the C union; and it is less the more readily the Hg is excreted. The non-toxic compds. of (1) are excreted almost entirely within 24 hrs. after injection. $Hg(C_2H_5)_2$, which is extremely toxic despite the fact that the Hg is bound to 2 C atoms, is hardly excreted at all. The symptoms immediately following the injections were great drop in blood pressure, convulsions, and general symptoms of central over-stimulation. If the dose was not enough to kill at once the animal recovered to live 1–4 days, when it died of injury to the heart or vessels. If the dose were not sufficient to kill in this stage the animal might go on until the third stage developed, with the nephritis and enteritis characteristic of chronic Hg poisoning. It appears probable that the splitting off of the Hg in the body from the organic nucleus of the mol. is preceded by the formation of organic HgCl compds. D. D. VAN SLYKE.

The Poisonous Action of Oxalates and the Physiological Function of Calcium. OSCAR LOEW. Munich. *Biochem. Z.*, 38, 226–43.—The poisonous action of neutral $K_2C_2O_4$ apparently arizes from pptn. of the Ca required to maintain the functions of the cells. Only the lowest organisms, such as the lower algae and fungi, which do not require Ca, are not killed by $K_2C_2O_4$. Observations on plant cells indicate that the chloroplasts and nuclei are the parts injured. D. D. VAN SLYKE.

The Influence of Magnesium Salts and of Sodium Sulfate on the Acidity of the Urin. L. DE JAGER. Leeuwarden. *Biochem. Z.*, 38, 294–305.—J. detd. the effect of $MgSO_4$, Na_2SO_4, and MgO on the NH_3, P_2O_5, and free acid content of his urin. The $MgSO_4$ was taken in daily doses of 6 g. for 6 successive days. The result was a marked increase in the NH_3 and free acid of the urin. Similar dosage with 8 g. portions of Na_2SO_4 resulted during the first 2 days of the series in a decrease on the NH_3 and free acidity, followed by a return to normal while the dosage was still being continued. Similar results were obtained with MgO. J. discusses the physiological and clinical significance of these results. D. D. VAN SLYKE.

Decomposition of Carbohydrate Acids in the Liver. JOSEPH WIRTH. Frankfurt a/M. *Biochem. Z.*, 33, 49–55.—W. reports perfusion expts. aimed to discover whether the presence of intermediate products of sugar oxidation prevent the formation of acetone from fatty acids in the liver. Livers were perfused with blood containing 2 g. of isovaleric or caproic acid to which 6 g. of gluconic or saccharic acid were added. The addition increased the amt. of acetone formed. The increase was due to the fact that the sugar acids also are acetone formers. D. D. VAN SLYKE.

The Influence of Poisons on the Catalase and So-called Pseudoperoxidase in the Blood. F. DUNKER AND A. IODLBAUER. Univ. Munich. *Biochem. Z.*, 33, 253–67.—The substance in the blood which causes oxidation of pyrogallol by H_2O_2 is probably not a true peroxidase, but a constituent of the hematin; the activity of the blood under all conditions runs parallel to the hematin content. This is not true of the catalase. The following results were obtained with blood from poisoned rabbits. HCN decreased the catalase only slightly, although when added to blood *in vitro* it has a marked

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effect. The alkalinity and no. of red cells were unchanged. Arsenic in poorly nourished animals caused an increase of 22% in the catalase; well nourished animals showed but little effect. The red cells decrease about 9% and the alkalinity is appreciably diminished. AsH_3 decreases the catalase 63%, and also decreases the no. of red cells. P decreases the catalase 12% without changing the number of red cells. Chloralhydrate decreases the catalase 23% without changing the red cells, hemoglobin, or pseudo-peroxidase. The alkalinity is diminished. D. D. VAN SLYKE.

Anthrax and Salvarsan. GUSTAV SCHUSTER. *Münch. med. Wochschr.*, 59, 349–51.—Rabbits given 0.04 g. salvarsan per kilo intravenously at the same time that a fatal dose of anthrax is given subcutaneously are protected against infection. Salvarsan is protective if given thus 12 hrs. after infection; 18, 24, or 30 hrs. after infection there was no effect. Salvarsan given intravenously immediately (within 3 min.) with anthrax, intravenously, protects against infection, but after 1 hr. does not. H. J. CORPER.

I. ZOOLOGY.

R. A. GORTNER.

The Effects of Alcohol not Inherited in Hydatina senta. D. D. WHITNEY. Wesleyan Univ. *Am. Nat.*, 45, 41–56.—Four strains of rotifers were employed, all descended from the same female. One strain was kept in H_2O as a control and the others were kept in 1.0%, 0.5%, and 0.25% soln. of alc. Expts. were carried through 28 successive generations. The rate of reproduction was lessened in proportion as the alc. conc. was increased. Individuals from the 1% alc. culture in the 11–15 generations showed lessened resistance to the action of a dil. $CuSO_4$ soln. (1/14,000 g. mol.) as compared with the control. When the alc. was removed and the offspring of the 1% alc. culture grown in H_2O the reproduction rate, and the resistance to $CuSO_4$, become normal in the 2nd generation. The grandchildren possess no defects caused by the use of alc. by the grandparents. R. A. GORTNER.

Peptolytic Enzymes in Parasitic Worms. EMIL ABDERHALDEN. *Z. physiol. Chem.*, 74, 409–10.—Uninjured living cestodes and ascarides, placed in silk-peptone soln., do not cause any sepn. of tyrosine; it appeared rapidly upon cut surfaces, especially on that of the opened intestin. A. HUNTER.

The Chemistry of the Vesicular Fluid of the Hedgehog. F. G. HOPKINS. *J. Physiol.*, 43, 259–60.—Suspended crystalloid material was sepd. from the milky fluid expressed from the seminal vesicles of the hedgehog. Sepn. was effected by centrifuging and washing with normal saline and H_2O. It is a protein contg. P, gives the protein color reactions and is insol. in alkalies. J. F. LYMAN.

Composition of the Secretion of Timarcha tenebricosa. E. W. CARLIER AND C. L. EVANS. *Separate; J. Chem. Soc.*, 100, II, 908.—The ash of the red secretion of the bloody-nosed beetle, contains Ca, Fe, Mg, K and Na, H_3PO_4, and Cl. The most abundant salt is Ca phosphate. The secretion contains albumin and globulin; the pigment is mainly lipochrome, and is sol. in alc. and ether. The fluid bubbles with NaBrO, and contains a Cu-reducing substance in small quantities. No enzymes were found. E. J. C.

Gaseous Exchange in Animals with Smooth and Striated Musculature. OTTO COHNHEIM. Heidelberg and Naples. *Z. physiol. Chem.*, 76, 298–313.—There are no evident differences in the gas metabolism of animals with smooth and those with striated musculatures. Expts. were carried out on crabs, *Palaemon serratus*; molluscs, *Eledone moschata*; snails, *Aphysia limacina* and *Aphysia punctata*; worms, *Glycera siphonophora* and *Nephthys hombergi*. G. M. MEYER.

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Permanent Contractions of Smooth Muscles. OTTO COHNHEIM AND J. VON UEXKULL. Heidelberg. *Z. physiol. Chem.*, 76, 314–21.—Expts. with leeches, *Hirudo medicinalis*, show without doubt that the contractions of smooth muscles require an expenditure of energy. The energy exchange increases with the load. G. M. M.

12. FOODS.

W. D. BIGELOW.

Chemistry of Foods in 1910. S. ROTHENFUSSER. *Z. angew. Chem.*, 25, 241–50, 293–302. E. J. C.

Annual Report of the Bureau of Food and Condiment Investigation of the Allgem. Oesterr. Apoth. Ver. M. MANSFIELD. *Z. Oesterr. Apoth. Ver.*, 49, 513, 526, 539.—Results of the analyses of 1303 samples, of which 23% were adulterated, are discussed. Detailed results are given for 8 samples of whisky. A. SEIDELL.

Yeasty Flavored Butter. L. F. ROSENGREN. *N. Y. Produce Rev. and Am. Cream.*, 32, 702–4; *Expt. Sta. Record*, 25, 780.—By overripening a starter contaminated with *B. lactis acidi* (Leichmann) this species appears sooner or later accompanied by yeast fungi in greater or lesser quantities. The bacteria were thus considered not the direct cause of yeasty taste in butter, but indirectly in proportion as they favored the development of the yeast in the starter, the cream, and the butter. This explains why a yeasty taste occurs in butter, where the ripening temp. is below 20°, as although this is a temp. lower than that at which the long lactic acid bacteria grow it is favorable to the yeast. Directions for handling the milk in order to prevent the defect are given. J. J. M.

Relation of Composition of Milk to Cheese. H. LASKOWSKY. Königsburg. *Milchwirtsch. Zentr.*, 7, 545–76.—L. used several different hard and soft cheeses. Whole milk, $^1/_2$ skimmed and $^2/_3$ skimmed milk were used. Results: (1) Contrary to expectations, the variations in N were greater than those of fat in the milk used. (2) The total amt. of fat in 100 lbs. milk and in cheese made from milk differs little. (3) The lowest limit of fat in dry matter of cheese made from whole milk is 40%. (4) In Camembert cheese, the fat content of the cheese is not closely related to that of milk. (5) In hard and soft cheeses, the processes of making and of ripening differ. (6) When the same curd is used in making Romadaur and Limburger cheeses, the relation of fat and protein in milk and cheese agree well. (7) In hard cheeses, the av. loss of milk fat in making and ripening process is 6.08% of amt. in milk; for soft cheeses, the loss in 5.04% with Limburger, 5.38% with Romadour, with Camembert about 4% more. (8) The relation of protein content of milk and cheese is not the same in different kinds of cheese. (9) The proteins are broken down in ripening with formation of gaseous products. The factor 6.37 for converting N into protein is not always correct in ripe cheese. L. L. VAN SLYKE.

Bacteriological Investigations in Dairy Practice. H. WEIGMANN AND A. WOLFF. Kiel. *Milchwirtsch. Zentr.*, 41, 2–6.—This relates to buttermilk and to milk coagulating with abnormal rapidity. L. L. VAN SLYKE.

Swine-feeding Experiments with Dried Potato Chips and Pressed Potatoes. Proskau Dairy Inst. Klein. *Milchwirtsch. Zentr.*, 41, 6–13.—Practically no differences were observed in results. L. L. VAN SLYKE.

Behavior of Acid Proteolytic Bacteria of Cheese at Low Temperatures in Cheese Ripening. C. GARINI. Mailand. *Milchwirtsch. Zentr.*, 41, 13–7.—(1) Acid rennet-forming bacteria, especially acid proteolytic cocci, are able to grow even at temp.

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under 10°, so that, apart from lactic acid bacteria proper, they are in condition to work during the process of ripening in winter storage, as in case of long-ripening cheese (Parmesau, Sbrinf, etc.). (2) The proteolytic enzymes of these bacteria are able even under 5° to produce changes on the inside of cheeses during very cold periods of keeping over winter. (3) The activities of these bacteria and their proteolytic enzymes agree with recent views of American investigators in respect to the possibility of cheese ripening in cold storage. (4) The ability of proteolytic enzymes of acid rennet-forming bacteria to work at very low temps. independent of the living bacteria themselves is due to a sufficiently luxuriant growth of the bacteria during the early stages of cheese ripening. The continuation of bacterial work is then carried on by the intra- and extra-cellular enzymes. L. L. VAN SLYKE.

Calculation of Cheese Yield from the Density of Whey. H. HÖFT. *Milchwirtsch. Zentr.*, 41, 17–8.—A discussion of different formulas. L. L. VAN SLYKE.

Significance of Depression of Freezing Point of Milk. L. PINS. *Diss.* Leipzig, 1910, 54 pp.; through *Milchwirtsch. Zentr.*, 41, 18–20.—The investigation covered work with 140 samples of milk from 35 cows. Variations ranged between —0.529 and —0.569. Milk first drawn always showed lower f. p. than milk last drawn; as a rule, morning milk had lower f. p. than evening milk. Breed, age and lactation stage of cows has no connection with f. p. Adding water to milk lowers f. p. so that addition of 10% water can be readily detected; this affords a more sensitive means of detecting added water than sp. gr. or fat. L. L. VAN SLYKE.

Present Status of the Question Regarding the Identity of Pepsin and Chymosin. W. GRIMMER. *Milchwirtsch. Zentr.*, 7, 481–505. A review of the literature. L. L. VAN SLYKE.

Investigation of Skim and Butter-milk. W. D. KOOPER. Güstrow. *Milchwirtsch. Zentr.*, 7, 505–11.—This is a study of comp., physical properties, and food value. Tabulated results are summarized as follows:

	Fat.		Casein.		Albumin.		Milk sugar.		Lactic acid.		Ash.		Solids.	
	Sk.m.	B.m.	Sk.m	B.m.	Sk.m.	B.m.	Sk.m.	B.m.	Sk.m.	B.m.	Sk.m.	B.m.	Sk.m.	B.m.
Lowest %	0.13	0.25	2.23	2.06	0.63	0.74	4.25	4.27	0.132	0.132	0.60	0.60	8.27	8.38
Highest %	0.20	0.37	2.52	2.33	0.96	1.06	4.28	4.28	0.139	0.139	0.70	0.69	8.56	8.64
Average %	0.18	0.30	2.31	2.18	0.83	0.93	4.27	4.28	0.137	0.137	0.66	0.65	8.45	8.48

Skim milks gave catalase 3.75–7.30 cc. O in 2 hrs., av. 6.1; buttermilk, 5.9–10.1, av. 7.5. Reductase was shown by decoloration in skim milk in 11 min. 15 sec. to 60 min., av. 28½ min.; in buttermilk, 7 min. 45 sec. to 17 min., av. 12½ min. In comparing cost of nutritive material in whole milk, skim milk and buttermilk, the ratio is 1 of skim milk to 1.1 buttermilk and 2.5 whole milk. L. L. VAN SLYKE.

Colloid-chemical Studies of Milk. G. WIEGNER. Univ. Göttingen. *Milchwirtsch. Zentr.*, 7, 534.—Milk serum was prepared by removal of casein through treatment with acid, rennet and heating after addition of $CaCl_2$. The index of refraction was studied in serum. Preference is given to $CaCl_2$ serum. A table is given showing relations in serum of refraction number, n, sp. gr. and solids. L. L. VAN S.

The Control of the Milk Supply and Milk Examination. H. LÜHRIG AND L. KRESSNER. *Milk. Ztg.* (*Hildesheim*), 25, 47–50; *Expt. Sta. Record*, 25, 207.—The value of the $CaCl_2$ serum test (*E. S. R.*, 23, 309) is greatly dependent upon the system of milk control which is in vogue in the community where it is to be applied. The various factors which influence the fat, etc., content of milk, and the results of a study made in regard to such influencing factors are discussed. $NaHCO_3$, borax, H_3BO_3, and Na_2CrO_4 in concs. of 0.005–0.1% in aq. solns., have no influence on the refraction.

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Formalin has an influence when over 0.3 cc. were present, but not in the amts. in which it is employed as a milk preservative. Salicylic acid increases the refractivity when present to the extent of 0.05%. The greatest deviation in the morning milks is 1.3 scale divisions, in afternoon milks 1.5, and in evening milks 1.5. J. J. M.

Some Asiatic Milk Products. D. HOOPER. *J. Asiatic Soc. Bengal*, 7, 63–7 (1911); *J. Soc. Chem. Ind.*, 30, 1027.—Analyses in % are given of 2 kinds of dried skim cheese prepared in Northwestern India and Afghanistan, etc., and known as karut or kurut, of a product obtained by acidifying hot milk and known as chhana and of "dahi," prepared by allowing buttermilk to ferment.

	Karut.	Karut	Chhana.	Dahi.
Water	9.0	8.8	62.45	89.58
Fat	3.0	7.1	19.80	2.40
Casein	74.4	58.0	15.63	3.15
Sugar, etc	7.0	8.7	0.37	3.70
Lactic acid	trace	1.4	0.50	0.57
Ash	6.6	16.0	1.25	0.60
	100.0	100.0	100.00	100.00

J. J. M.

The Analysis of Altered Milk. ANDRÉ KLING. *Ann. fals.*, 4, 38, 363.—K. briefly recalls the details of his and Roy's method (*C. A.*, 3, 2183) and maintains that the modifications by Ronnet (*C. A.*, 6, 518) are of little value and lead to error. He believes that NH_3 is lost if no acid is added, that a uniform sample is not secured in the aliquots, and that the presence of sand causes bumping in the Kjeldahl flasks. K. has modified the method by washing the coagulum on the filter several times with dist. water, adding the washings to the 1st filtrate, partially drying the coagulum at 90–95°, extracting 4–5 hrs. with acetone 1st and then with ether completely. Frothing in the Kjeldahl is lessened by leaving the material in contact with the acid for some hrs., then raising the temp. slowly during the heating. W. A. BRANNON.

The Influence of Beet Leaves on the Production and Composition of Milk. M. A. VIVIER. *Ann. fals.*, 4, 638.—An investigation to ascertain whether the feeding of beet leaves in large quantities in the rations of milk cows could cause the condemnation of the milk as watered by chem. analysis. The ration of beet leaves was supplemented by peanut cakes and 2nd crop alfalfa. A comparative ration of corn-fodder was used. The results showed that the total vol. of milk produced on the beet-leaf ration was less than that from the corn fodder; the amt. of fat per l. was greater. No possibility of confusing the milk from the beet-leaf ration with watered or skimmed milk was evident from its chem. analysis. W. A. B.

Boiling Test, Alcohol Test, and Degree of Acidity of Milk. O. RAMMSTEDT. *Z. öffent. Chem.*, 17, 441–55.—A lengthy discussion of the value of these methods in testing the freshness of milk. Tables of results showing the relative correspondence of the 3 tests are included. *Ibid.*, 467–70.—Milk which gives the b. test is unfit for household use. The alc. test is considered good in the preliminary testing of market milk for freshness. These 3 tests are not sufficient for the hygienic exam. of a milk, but must be accompanied by curd test, fermentation test, catalase, reductase, and leucocyte tests. W. A. B.

The Effect of Feeding with Coconut Cake and Linseed Cake on the Composition of Butter Fat. H. T. CRANFIELD. *Analyst*, 36, 445.—The character of the feed has a great influence on the comp. of butter fat. Coconut cake fed to dairy cows produced a butter which gave a refractometer figure below normal, a high Polenske no. and a

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normal R.-M. no. Feeding with linseed cake raised *n* above normal, but greatly depressed the Polenske no. Coconut cake produced a butter of good quality, possessing better keeping properties than butter from linseed or cotton cakes. The Shrewsbury and Knapp method (*C. A.*, 4, 3306) for detection of coconut oil possesses practically no advantages over the Polenske method. A. W. BROOMELL.

Abnormal Lard. VITOUX. *Ann. fals.*, 5, 31.—The content of free fatty acids in lard does not vary appreciably with the origin of the lard, nor with the method of rendering employed (whether at a high or low temp. or whether or not the rendering vessel is heated with an open fire). The content of free acids is directly dependent on the state of preservation of the raw fat before rendering. A. W. B.

Composition of Indian Yams. D. HOOPER. *J. Asiatic Soc. Bengal*, 1911, 57–62; *J. Soc. Chem. Ind.*, 30, 1027.—Analysis of 40 specimens of different species of yams are recorded. J. J. M.

Acids in Honey. A. HEIDUSCHKA. *Pharm. Zentralhalle*, 52, 1051–3; *Schweiz. Wochschr.*, 49, 725–7; cf. *C. A.*, 5, 2276.—Of the volatil acids, formic acid constitutes more then $^1/_2$, the others being butyric, valeric, caproic, capric. Among the non-volatil acids are found lactic 0.0225%, malic 0.0019%, traces of tartaric, some oxalic and succinic. The detn. of the latter was undertaken after the method of H. and Quincke (*C. A.*, 2, 1852). Free fatty acids were found in very minute quantities. In 100 parts of honey the following quantities of acids, expressed in cc. of 0.1 *N* KOH, were contained: Total acids, 12–20.2, volatil acids, 1.7–1.9, HCOOH, by $HgCl_2$, 0.46–1.37, as CO, 0.41–1.2, lactic acid 2.3–2.8, malic acid 0.19–0.45, H_3PO_4 as g. of P_2O_5, 0.025–0.032. A. VORISEK.

A New and Rapid Method for the Extraction of Saccharin from Food Substances. GIOVANNI POSSETTO AND GIOVANNI ISSOGLIO. Turin. *Giorn. farm. chim.*, 61, 5–11.—The authors have grouped the food substances contg. saccharin under headings: (*a*) Beverages; (*b*) substances rich in albuminoids and greases; (*c*) substances rich in pectins and gums; (*d*) substances rich in albuminoids, carbohydrates, and greases. Ordinary methods apply in detg. saccharin in the first class; the other classes usually form emulsions which render quant. detns. impossible, due to faulty sepn. of solvents, ether, petroleum ether, chloroform, or benzol. After trying all general methods, the method of dialysis, using the app. of G. Bono, was found to give excellent results. The app. consists of a glass cylinder about 5 cm. in diam. and a height of 3 cm., enlarging until greatest diam. is 8 cm.; total height is 8 cm. A pergamot cup as a dialyzer rests on the beaker part, or cylinder. The pergamot cup is filled with the substance to be extracted, previously made alkaline, the cylinder is filled with dist. H_2O, and dialysis continued for 24 hrs. Greases, carbohydrates, albumonoids, etc., remain in cup; saccharin and a few other crystalloid substances pass into water. The aq. fluid is made acid with phosphoric acid, extracted (shaken out) with ether, evapd. on bath, dried and weighed, and tested for saccharin. In jams and marmalades, care should be taken to see that the residual saccharin does not give salicylic acid test with $FeCl_3$, as this substance is used as preservative. To sep.: (*a*) Treat dialyzed liquid with a soln. of 1% $KMnO_4$ acidulated with H_2SO_4, let stand 12 hrs. in cold, filter, eliminate excess of $KMnO_4$ with H_2SO_3, exhaust with ether, which will yield the saccharin in pure state; (*b*) treat liquid with excess of Br water, filter, extract filtrate with ether and det. saccharin as usual. M. BYE.

The Occurrence of Arsenic in Food Gelatin. O. KÖPKE. *Arb. Kais Gesund.*, 38, 290.—The paper deals with the occurrence of As in gelatin prepared from material in which As sulfide was used in the preliminary treatment of the animal hides for the manuf. of leather. The method used for the detn. of the As is given, with tabulated

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results of 12 samples examd. The samples show the presence of amts. undeterminable to as much as 30 parts of As_2O_3 per million. J. I. PALMORE.

The Quantitative Determination of Benzoic Acid. EDUARD REMY. Bielefeld. *Apoth. Ztg.*, **26**, 835–6. W. O. E.

The Bread Question. J. S. WALLACE. *Brit. Med. J.*, 1911, 437–8.—Bread, especially when eaten with crust, does not induce dental caries. Toasted bread is superior in this respect to untoasted. Of the nutritive value of bread W. says: "The amt. of phosphates or protein absorbed from 1 kind of bread may be greater than from another kind. More phosphates are absorbed from white than from coarse whole-meal bread. WM. P. GARRETY.

A Preliminary Note on the Nutritive Value of White and of Standard Bread. L. HILL. *Brit. Med. J.*, 1911, 1068–9; *Expt. Sta. Record*, **25**, 566.—White and so-called standard bread were compared in tests with rats fed exclusively on such breads or flour and water for 6 weeks. The total gain on white flour was 114 g. and on standard flour (*i. e.*, flour containing sufficient germ and bran products to make it represent 80% of the original wheat berry) 278 g. Ten of the rats fed on white flour died, as compared with 5 fed on the flour bread. Another lot was fed on white flour plus an amt. of wheat germ about equal to that in standard flour; results as good as those with such flour were obtained. When pancreatic digestion tests were made the standard flour gave the Adamkiewicz reaction for tryptophan earlier, showing that this essential amino acid is spilt off earlier, and therefore is probably better absorbed in the intestin and utilized in the body. Tests in which 15 individuals chewed a weighed quantity of 2 sorts of flour for 2 min. did not show any differences in acidity. Either our standard flours contained something essential to growth which was not in our white flours, or the white flours contained something detrimental, *e. g.*, improvers. It is highly probably that the germ contains amino acid groupings essential for growth, and possible substances which activate the enzymes engaged in the digestion of the proteins of wheat. Treatment of the white flour may have destroyed these substances. J. J. M.

Comparative Nutritive Value of White and Standard Bread. C. WATSON. *Brit. Med. J.*, 1911, 1151; *Expt. Sta. Record*, **25**, 566.—A criticism of the paper by L. Hill, (preceding abstr.). In expts. on rats fed on white and standard bread no appreciable differences could be observed which could be attributed to the kind of bread. J. J. M.

Comparative Nutritive Value of White and Standard Bread. E. S. EDIE AND G. C. E. SIMPSON. *Brit. Med. J.*, 1911, 1151; *Expt. Sta. Record*, **25**, 566.—Tests with pigeons show that standard or whole meal bread is superior to white bread (cf Hill and Watson, 2 previous abstracts). J. J. M.

Detection of Alum in Flour and Bread. W. LENZ. Univ. Berlin. *Apoth. Ztg.*, **26**, 687–9.—Samples were examined colorimetrically both by the method of Claes, (*Real-Enzyklopaedie der gesamten Pharmazie*, 1st ed., Vol. 6, p. 312) with a cold alc. decoction of logwood, and with a 1% soln. of hematoxylin in alc. (50% by wt.). With flour, Claes' method proved quite satisfactory in quant. work; for the qual. detection, however, hematoxylin soln. was preferable. The ash was also examined for alumina microchemically with $KHSO_4$, as well as colorimetrically with hematoxylin soln., which latter proved the more satisfactory. With bread, logwood soln. failed to indicate minute quantities of alum; hematoxylin soln. however gave more positive results, though for legal work it was deemed advizable to test the ash microchemically for alumina. W. O. E.

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Further Studies on the Fermentation of Wheat and Oat Flours. MAX KLOTZ. Strassburg. *Monatsschr. f. Kinderheilk.*, 10, 285; through *Jahrb. Kinderheilk.*, 75, 91. M. S. F.

A Chemical Investigation of American Spearmint Oil. E. K. NELSON. U. S. Dept. Agr., Bur. Chem., *Circ.* 92.—Results of the exam. of a spearmint oil produced in Michigan are reported. Besides carvone (66%), the presence of limonene, a small amt. of phellandrene, and dihydrocarvenone, both free and as ester, are proved. Dihydrocuminyl alc., reported by Elze (*C. A.*, 5, 762) as a constituent of a spearmint oil examd. by him, was not found. AcOH was found; also traces of some of its homologs. Dihydrocarvenone acetate has an odor similar to that of spearmint oil. E. K. NELSON.

Digestion Trial with two Jersey Cows on Full Ration and on Maintenance. C. H. ECKLES. Univ. Missouri Agr. Exp. Sta., *Research Bull.* 4.—These expts. seem to indicate that the av. digestion coeffs. in general use are too high, at least with cows producing large quantities of milk. WM. P. GARRETY.

Maintenance Trials with Five Jersey Cows. C. H. ECKLES. Univ. Missouri Agr. Exp. Sta., *Research Bull.* 5.—Two of the animals used were those used in the expts. noted above (cf. preceding abstr.). The av. maintenance requirements were found close to the standard suggested by Armsby and Haecker. WM. P. GARRETY.

Winter Steer Feeding. J. H. SKINNER, F. G. KING AND H. P. RUSK. Purdue Univ. Agr. Exp. Sta., *Bull.* 153.—This treats of corn silage and clover hay as roughage for fattening steers, the influence of different proportions of cottonseed meal in rations for fattening steers, and long *vs.* short feeding. WM. P. GARRETY.

Some Examinations of Oat Varieties of Different Nativity and their Food Value. O. NEUMANN. *Wochschr. Brau.*, 28, 261–4.—The chief differences of the varieties examd. were found to exist in the 1000 berry-wt., nature of the husk, and variation in albumin content. The % of fat was practically uniform. The moisture content is important owing to its influence on the storage of the oats and the unnecessary increase in wt. In the exam. of oats the following points should receive attention: (1) healthy appearance, (2) moisture content not to exceed 15%, (3) 1000 berry-wt. 28–29 g. on dry basis, (4) husk content not to exceed 25–27% (dry basis), (5) albumin content should not fall below 10% nor exceed 13%. C. A. NOWAK.

Sugar and Acid in Pears (RIVIÈRE, BAILHACHE). 11D. Sugar and Acid in Grapes. (RIVIÈRE, BAILHACHE). 11D. Utilization of Yeast (HAYDUCK). 16. Examination of Species of Strychnos (SIEVERS). 17. Determination of Methyl Alcohol (SIMMONDS). 7. Hydrocyanic Acid in Almonds (DE PLATO). 11D. Purification of Oysters (FABRE-DOMERGUE). 14.

Ger., 230,985, Oct. 24, 1909. A. BEHR. **Washing thin particles of butter and margarine.** The material to be washed is contd. in a vessel with germ-free water, and air under pressure is forced through the mass in different directions, the agitation resulting in the carrying off of the impurities with the water.

Ger., 231,923, Mar. 29, 1908. A. BERNSTEIN. **Production of milk for infants from cow milk,** based upon the influence of trypsin and rennet. The cream is sepd. from the milk and the skimmed milk is subjected in 2 parts to further treatment. One part is rendered alk. by the addition of alkalies or alk. salts, and exposed at 40°, for about 25 min., to a ferment dissolving albumin such as trypsin, so that the albuminous substances are hydrated. To the skimmed milk thus treated the other half is added,

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acidulating with an acid or an acid salt. Rennet is also added, the action of which, together with the rennet originally contd. in the trypsin, effects the coagulation of the albuminous bodies to a gelatinous mass. Upon gentle heating the sepn. of a clear whey is expedited. The whey is now mixed with the cream first sepd., whereupon the product can be sterilized in bottles without the least visible sepn.

14. WATER, SEWAGE AND SANITATION.

EDWARD BARTOW.

Relation between Conductivity and Salt Content and between Conductivity, Chlorine Content and Hardness. P. A. MERBURG. *Chem. Weekblad*, 8, 977–82.—M. gives the results of a series of expts. showing the relationship between salt content and sp. cond. (K). The equiv. cond. (Λ) of salts in conc. like those in natural waters is about 100 at 18°. The av. equiv. wt. of the salts usually present is 75. Then the equiv. conc., $\eta = (K/\Lambda) = (K/100)$. Then the number of mg. per l. present in a sample would be represented by $0.75 \times K \times 10^6$. The relation between cond., Cl content and hardness is expressed by the equation: Hardness = [$K \times 10^6$—3 (mg. Cl per l.)/30]. The calc. results are in fair agreement with the facts. The method is of use where it is desired to det. in a few moments the approx. amt. of total solids and hardness of a sample of water. H. L. HUENINK.

The Disinfection of Public Water Supplies. WILLIAM C. LOUNSBURY. *Proc. Eng. Soc. Wis.*, 1911, 92.—A brief review of water disinfection by $CuSO_4$, ultraviolet rays, creosote, and $Ca(OCl)_2$. E. BARTOW.

Ozone Experiments in Water Treatment. W. F. MONFORT. *Proc. Ill. Water Supply Assn.*, 1911, 131.—As a practical working process, the use of ozone is neither economical nor to be depended upon. For experimental work its use is suggested as serviceable in the study of bacterial life, especially in detg. difficultly removable spore formers, and the limit beyond which bacterial removal with bleach is impracticable. D. K. FRENCH.

Sterilization of Water by Ultraviolet Rays. ROLLE. *Wochenschr. Brau.*, 28, 533–4.—The app. devized by Rogers can be fitted to any water tap. A cylindrical Hg lamp 30 cm. long enclosed in quartz is fixed in the axis of an Al tube 10 cm. wide constricted near the end so that the water in passing is brought very near the lamp. A current of 6 amps. and 30 v. is required and produces 1000–1500 l. abs. steril water per hr. This sterilization is cheaper than that by means of O_3, the app. more simple and less costly. C. A. NOWAK.

Treatment of Drinking Water with Ultraviolet Rays. E. O. SCHEIDT. St. Petersburg. *Chem. Ztg.*, 36, 34.—Two quartz lamps, tube length 60 mm., 4 amp., 110 v., in special tanks were used in experimenting on St. Petersburg city water. Complete sterilization was not accomplished, but the results compare favorably with those of treatment with ozone or hypochlorite. Detailed costs and results are not given. R. B. DOLE.

The "Luminator" Treatment of Water. H. B. LAKE. Nottingham. *J. Soc. Chem. Ind.*, 31, 57–60.—Investigation of statements regarding the "luminator" treatment of boiler waters (*C. A.*, 5, 2288, 3603). Very hard water was passed through tubes and V-shaped troughs of Al at different rates and under different conditions of light. Detns. of total and permanent hardness, "soluble" and "insoluble" Ca and Mg, sulfates, and carbonates failed to reveal appreciable change in condition of the water by treatment, and L. concludes that the process causes no considerable reduction

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or increase in the resultant salts, either in the "ionic" state or as combined salts on evapn. R. B. DOLE.

Analysis of Mineral Waters. V. IPAT'EV. *J. Russ. Phys. Chem. Soc.*, 41, 667. J. J. M.

Analysis of Chemicals Used in Water Treatment. E. BARTOW AND H. P. CORSON. *Proc. Ill. Water Supply Assn.*, 1911, 114.—The chemicals and most important constituents considered in full are: $Al_2(SO_4)_3$, free Al_2O_3 or free H_2SO_4 and combined Al_2O_3; $FeSO_4$, ferrous Fe; lime, available CaO; soda ash, available Na_2CO_3; bleaching powder available Cl. Optional methods are given in many cases. The discussion added modifications to the methods for alum, the $SnCl_2$ method for Fe and a method for free H_2SO_4 in $FeSO_4$. D. K. FRENCH.

Effect of Feed Water Containing Sugar on Boilers. F. P. PILLHARDT. *Centr. Zuckerind.*, 19, 1119–20.—When a small amt. of sugar enters the boiler from entrainment or such, its corrosive action due to the acid decomp. products may be obviated by the addition of NaOH. An excess of NaOH will cause foaming. The amt. to be added should be controlled by titration of the boiler water using rosolic acid as indicator, and should not exceed an alkalinity equal to 10 cc. of 0.1 *N* acid in 100 cc. When large amts. of sugar enter the boiler, NaOH has no effect as amorphous C from the sugar, layers the tubes, hindering the heating and unless the boiler is cut out may often cause an explosion. Besides the acid decomp. products causing corrosion, caramel substances have the same effect. A. H. BRYAN.

Ground Water Supply of the Witwatersrand. D. C. LEITCH. *Eng. Record*, 65, 202.—An eng. description of the supplies. The av. hardness is 190 p. p. m.; sometimes 2 p. p. m. Fe are found. Lime is used. Weed growth is prevented by $CuSO_4$, 1 part in 3 million, followed by aeration and cinder filtration. 8–18 lb. $Ca(OCl)_2$ are used per million gals. at times. Cost of water 58.4 c. per 1000 gal. LANGDON PEARSE.

Purity of Shallow Well Waters. H. W. HILL. *Proc. Ill. Water Supply Assn.*, 1911, 180.—From the standpoint of typhoid pollution, the shallow well, especially the private family well, is the least liable source of the original infection, and its investigation of little value, as the sample is rarely taken less than 3 weeks after possible date of infection. Wells subjected to infected surface wash should not be used under any condition. D. K. FRENCH.

Municipal Water Works at Cambridge. J. JULIAN. *Contract J.*, 1911, 1164; *Wasser u. Abwasser*, 5, 86–7. ARTHUR LEDERER.

New Settling Basin of the Water Works at Kansas City. WYNKOOP KIERSTED. *Eng. News*, 67, 371–3; *Eng. Record*, 65, 88–92; *Eng. Contr.*, 37, 215–9.—An eng. description. Float studies and turbidity records are given. The removal of turb. averaging 12 pts. per mil. LANGDON PEARSE.

Experiments on the Purification of Drinking Water at Marseilles, France. ED. BONJEAU. *Tech. san.*, 6, 173–84; *Wasser u. Abwasser*, 5, 49–51.—Among the various systems tried were, sand filters, sterilization by the aid of ultraviolet rays, ozonization, and chem. pptn. The plants were large enough to permit of practical conclusions, but no comparative estimate as to the cost of purification could be made. A description folows as to what degree of purification could be obtained by using the various methods. ARTHUR LEDERER.

A Cause of Typhoid Outbreaks. WILLIAM WESTERFIELD. *Mun. J. Eng.*, 32, 280.—A typhoid epidemic at Lincoln, Neb., was traced to a broken sewer 37 ft. from a shallow well, 1 of 3 supplying the city. LANGDON PEARSE.

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Sewage Problem and its Relation to Water Supply. LANGDON PEARSE. *Proc. Ill. Water Supply Assn.*, 1911, 97.—"The extension of intakes is merely temporizing with the problem and is, in a way, a dangerous one from a sanitary standpoint.... the most lasting and satisfactory results will come by a judicious combination of sewage disposal and the purification of the water, wherever the sewage cannot be diverted from the water supply." Representative water works conditions are cited and the general problems explained. The work of an experimental plant at the 39th St. Sewage Pumping Sta., Chicago, is outlined. D. K. FRENCH.

Importance of Nitrates in the Treatment of Sewage and Sludge. F. GUTH AND P. KEIM. *Gesundh. Ing.*, 35, 57–62.—Nitrates added to sewage exert the same oxidizing action as the end products in the mineralization of N substances in biologic treatment. It is likely that the proposed treatment of sewage with salpeter might serve as a substitute for biologic purification of domestic sewages within certain limitations. Some of the chem. reactions involved in the addition of nitrates are as yet not fully understood. Undoubtedly the nitrates would remain inert without the presence of micro-organisms. ARTHUR LEDERER.

Utilization of Waste Steam at the Milwaukee Refuse Incinerator. J. A. MESIROFF. *Can. Eng.*, 22, 357.—An eng. outline of a proposed power plant to be used for driving flushing pumps. LANGDON PEARSE.

Matches as Grease Collectors. A. E. PHILLIPS. *Eng. Record*, 65, 249.—The matches form a nucleus for grease balls which are removed by a wire mesh scoop. LANGDON PEARSE.

The Condition of an Intermittent Sand Filter for Sewage after 23 Years' Operation. *Mass. Bd. Health*, 1910; *Eng. Contr.*, 37, 271.—There has been no appreciable increase of clogging in 23 yrs. No sand has been removed from its surface since 1893. The permanence of such beds is emphasized with a discussion of the chem. processes in the filter. LANGDON PEARSE.

The Sewage Disposal Plant at Winchester, Ky. *Eng. Record*, 65, 250–1.—This is an engineering description of an Emscher tank on a sanitary sewerage system in a town of 7,500 people. LANGDON PEARSE.

Sewage Disposal Works at Baltimore. *Eng. Record*, 65, 200–2.—The degree of purification by sprinkling filters is thought sufficient at present. The plant consists of a screening chamber, meter house, 3 settling tanks, 3 sludge-digesting tanks, 1 acre sludge-drying bed, a control house, screens to protect the filters, four 3-acre sprinkling filters and 2 secondary settling basins. The drop of 18 ft. between works and river generates elec. current. The dosing app., under-drains and screening device are novel. LANGDON PEARSE.

Sewage Disposal of Pittsburg. ALLEN HAZEN AND GEORGE C. WHIPPLE. *Eng. Record*, 65, 209–12; *Eng. News*, 67, 398–402.—A review of an important report on the sewage situation, recommending a continuance of the present method of sewage disposal by diln. in the Ohio, Allegheny and Monongahela. The city is advized not to construct the works recommended by the Pa. State Bd. of Health, including sep. system of sewers, interceptors, pumping station, and purification works. The expense of such works, 46–73 million dollars is needless. Water from the Ohio for all the towns below could be filtered for a very small cost, and would require filtration any way. The local nuisance is small and the river flow sufficient for dilution under present conditions. LANGDON PEARSE.

Compulsory Sewage Purification. EDIT. *Eng. Record*, 65, 198.—Comment on the report of Hazen and Whipple (cf. preceding abstr.), approved by Stearns and

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Eddy. The medical man advizes sewage purification, the sanitary engineer water purification. LANGDON PEARSE.

Sewage Disposal of Berlin and the Earnings of the Sewage Farms. SCHNEIDER. *Z. ges. Wasserwirtsch.*, 1911, 158; *Wasser u. Abwasser*, 5, 83.—The earnings are satisfactory. Truck farms are rented out at $60–75 per hectare. Much grain, feed, oats and straw comes from the farms. Cattle are raised on a large scale, and the city is supplied with lumber from the forests located on the sewage farms. In 1911 over $26,000 worth of fruit was sold. Fish ponds are installed for the utilization of the effluents. ARTHUR LEDERER.

Sewage Farms of Friedrichsfelde at Berlin. A. ORTH. *Wasser u. Abwasser*, 5, 81–2.—In a period of 25 years the surface soil has been enriched by the sewage to the extent of 1712 kg. of humus, 96 kg. of N., 144 kg. of P, 84 kg. of K and 89 kg. of Ca. It could also be shown that the purification of the sewage is effected principally in the upper layers, and that it is similar to the biologic self-purification of rivers, and to the process taking place in a trickling filter. The factors which are responsible for the purification are, digestion, liquefaction, cleavage, combustion and gasification. Microscopic and macroscopic organisms decrease with depths, as a rule. Pathogenic bacteria are destroyed with the exception of anthrax spores. ARTHUR LEDERER.

Garbage Collection in Milwaukee, Wis. *Mun. J. Eng.*, 32, 310.—Recommendations in detail. LANGDON PEARSE.

Bacterial Purification of Oysters by Standing in Filtered Artificial Sea Water. FABRE-DOMERGUE. *Compt. rend.*, 154, 393–5.—The author describes tanks in which he keeps oysters in artificial sea water continually passed through a sand filter. He gives no bacteriological results. but states that oysters thus stored more than long enough to effect their purification retain their original flavor and vitality.
R. B. DOLE.

The Odors of Paris. O. BOUDOUARD. *Compt. rend.*, 154, 238–40.—The evil odors of Paris are attributed largely to the manuf. of fertilizers, phosphoguanos, and animal superphosphates (obtained by treatment of mineral phosphates with *N* H_2SO_4 resulting from the action of H_2SO_4 on animal refuse). Climatic changes have much effect on the odors produced. Thus higher temps. sudden changes in atm., and in the elec. conditions intensify the odor. Dried fertilizers are more objectionable than moist ones. The odor is more intense, also, at the seasons of shipment. R. H. JESSE.

Special Catalogs of the International Hygiene Exposition at Dresden, 1911. ANON. *Wasser u. Abwasser*, 5, 64–75.—Twelve catalogs treat the following subjects: The infectious diseases of man; animal diseases; tropical hygiene; city planning; houses and the housing problem; the chemical industry and its relation to health; climatology and meteorology; city cleaning; water supply; regulations in the field of teaching and sanitation in Prussia; history of sanitation; scientific balneology. The catalogs contain practically all that is new or important in the field of hygiene. ARTHUR LEDERER.

Waterproofing of Sewers (HAMMOND, *et al.*). 20. Irrigation with Sewage (WILLIAMS). 15. Disinfection (HERZOG, BETZEL). 11C.

Ger., 230,437, July 28, 1909. GEIGERSCHE FABRIK FÜR STRASSEN- UND HAUSENTWÄSSERUNGSARTIKEL. **Coarse rake for sewage purifying plants** with a raking off app. above the tines of the rake.

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Ger., 231,685, Feb. 10, 1909. H. SCHNEIDER. App. for the **removal of fatty substances from sewage sieves.**

Ger., 231,801, May 25, 1909. WASSERVERSORGUNG U. ABWASSERREINIGUNG BIOLOGOS. **Biologic filtration plant** with an air channel extending around all sides or only in part round the body of water to be oxidized.

15. SOILS AND FERTILIZERS.

F. P. VEITCH.

Studies on Soil Physics. I. The Flow of Air and Water through Soils. W. H. GREEN AND G. A. AMPT. *J. Agr. Sci.*, 4, 1–24; through *J. Soc. Chem. Ind.*, 30, 759.—The sp. pore or interstitial space (S) is the free space per unit vol. of soil. The permeability to water (P_w) may be measured by the quantity of water which will pass per sec., through a soil column of unit length and unit area, when under 1 cm. head of water pressure. The permeability to air (P_a) may be similarly defined. The capillarity coeff. (K) is the tension due to capillary forces per unit area of cross section of the pore spaces, which tends to draw water from the satd. to the dry portion of the soil. From these permeability and capillarity consts. can be constructed equations which will represent the rate of motion of air and water through the soil. The authors have studied movements in, (1) a friable loam from the grounds of the Univ. of Melbourne, (2) a clay soil from Werribee, Victoria, and (3) a surface sand from Canterbury, sufficiently free from colloidal clay to serve as an example of a highly permeable soil. The rates of motion agree with the deduced equations. It is therefore suggested that the detn. of S, P_a, P_w, and K, would be of more value than the detn. of the av. size of the particles in a mechanical analysis. To have their full value, the detns. should be made on the natural soil *in situ*, but the information is very valuable even when obtained from disturbed samples. E. J. C.

A Peculiar Soil Sickness. J. HUDIG. Rykslandbouwproefsta., Gröningen. *Landw. Jahrb.*, 40, 613–44.—In the peat settlement of Gröningen and Drent, plant sickness, especially oat sickness, has occurred. The cause is in the organic matter of the soil. Alk. fertilizers favor the formation of the injurious substances. Though the Mn content of the sick soil is as large as that of sound soil, the addition of Mn salts ($MnSO_4$, MnO_2) had a beneficial effect on the soil especially in its after-affects.

M. X. SULLIVAN.

The Arsenic-containing Soils of Reichenstein in Schl. H. GRUNER. *Landw. Jahrb.*, 40, 517–57.—As is present in the Reichenstein soil to the extent of 0.026–1.426% and is injurious to plants. Rock in the vicinity contains very little As. The As of the soil has its origin in the gases which escaped from primitive smelters. There is little evidence that the modern smelters are causing an increase in the As content of the soil. M. X. SULLIVAN.

Carrying Out Pot Experiments in Plant Physiology Studies. O. LOEW. *Chem. Ztg.*, 35, 801–2.—L. discusses inhibition of the full growth of plants in pots. The restriction by the walls on the growing roots is increased by the placement of too many plants in a small confined space. Lack of uniformity in the number of plants grown per unit wt. of soil is responsible for the wide variations in the results of pot expts. L. proposes as a max. 5 plants in a pot containing 10 kg. soil and for ordinary grain, wheat, rye, etc., suggests a fertilizer containing 3 g. P_2O_5, 3.5 g. N and 5 g. K_2O. On soils rich in $CaCO_3$, tertiary phosphates as well as di-Na or K phosphates must be avoided. In these cases superphosphates are the only correct fertilizers. In the

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absence of $CaCO_3$, a combination of superphosphates and NH_4 salts must not be used. The treated soil should never be allowed to become distinctly acid or alk.

J. S. GOLDBAUM.

The Effect of Calcium Carbonate on the Transformation of Ammonia and Nitrate Nitrogen by Soil Bacteria. VOGEL. *Mitt. Kais. Wilh. Inst. Landw. Bromberg*, 3, 330; *Bot. Cent.*, 117, 575.—The expts. confirm the results of Lemmermann and others that in soln. $CaCO_3$ increases the amt. of N transformed to proteins by soil bacteria to a considerable extent in the case of NH_3 and to a less extent with nitrate. This effect of $CaCO_3$ is not brought about when instead of solns., soils are used; in fact in the latter case decided N losses were noticed. H. A. SPOEHR.

The Movement of Nitric Nitrogen in Soil and its Relation to Nitrogen Fixation. R. STEWART AND J. E. GREAVES. Utah Agr. Coll. Exp. Sta., *Bull.* 114.—Eight years' experimental work has demonstrated a variation in the nitric N soil content, and conc. of the soil soln., with the water applied, the crop grown, and with the season. Although the soils used are chemically and bacteriologically adapted to bacterial activity, nitric N to a depth of 10 ft. was less than 300 lbs. per acre.

WM. P. GARRETY.

Fertility Experiments in a Rotation of Cow Peas and Wheat. I. The Utilization of Various Phosphates. C. A. MOOERS. Tenn. Agr. Exp. Sta., *Bull.* 90.—These expts. were made on soils poor in Ca. Liming appears to lower the availability of phosphate rock, but does not affect acid phosphate. Thomas slag gave favorable results. Phosphate rock does not appear to increase in effectiveness with lapse of time after incorporation with the soil. WM. P. GARRETY.

Some Bacteriological Effects of Liming. P. E. BROWN. Iowa Agr. Exp. Sta., *Research Bull.* 2.—Applications of Ca up to 3 tons per acre increase bacteria, ammonification, nitrification, and N fixation, in proportion to the quantity applied.

WM. P. GARRETY.

The Effect of Soluble Salts on the Physical Properties of Soils. R. O. E. DAVIS. U. S. Dept. Agr., Bur. of Soils, *Bull.* 82.—The addition of small amts. of sol. salts affect the physical properties and therefore the structure of the soil. No predictions can be made regarding the sp. direction or the amt. of the action on particular soils. The effect of salts is more pronounced in a soil containing a large % of fine soil particles and this leads to the conclusion that colloid-like clay particles are affected most by sol. salts and in turn effect most the structure of the soil. The actual nature of the condition produced in the smallest soil particles is not known beyond the fact that flocculation and deflocculation may be produced. M. X. SULLIVAN.

Variations in the Amounts of Single Phosphoric Acid Compounds in Seeds Depending on Conditions of Vegetation. S. LEWONIEWSKI. *Bull. intern. acad. sci. Cracovie*, 85–96; through *J. Chem. Soc.*, 100, II, 641.—Total N, protein N, total P, and P as lecithins, phytin, in proteins, and in inorganic forms were estd. in different varieties of barley grain obtained with different manures. The variations in the amts. of N and P depend chiefly on the conditions of growth. The amt. of H_3PO_4 in the same variety of barley grown in different places varied from 0.562 to 0.782% while 2 different varieties grown in the same place contained resp., 0.957 and 0.937%. The amts. of H_3PO_4 in the proteins vary only slightly; the differences in total P are due mainly to variations in inorganic P and phytin. With deficient phosphate manure the P is chiefly utilized for the production of nucleo compds.; production of phytin and accumulation of inorganic P only occur when the plants have abundance of phosphatic manure. The relations of total P and of P sol. in 1% AcOH to total N vary widely;

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the former varied between 100 : 50 and 100 : 32, and the latter between 100 : 20 and 100 : 6. Estn. of P sol. in 1% AcOH (inorganic P + phytin) will probably afford indications of the amt. of available P in the soil as good or better than those obtained by estg. the relation P_2O_5 : N in the grain. E. J. C.

The Significance of Phonolith as Potassium Fertilizer. F. Schacke, Tacke and Popp. *Chem. Ztg.*, 35, 1222.—Phonolith has some use as K fertilizer. Tacke and Popp point out that phonolith has some fertilizer value, but cannot be compared to K salts. M. X. S.

Fertilizer Manufactured by City. Anon. *Mun. J. Eng.*, 32, 278.—The Park Dept. of Los Angeles, Cal., makes a compost from manure, grass, etc., treating it with soln. of $Ca(OCl)_2$ 10 lbs., lye 1 lb., to 50 gals water. Fermentation is encouraged for 10 days. 12 in. layers are then alternated with 2 in. decomposed soil, wood ashes, lime and gypsum (4 : 2 : 1/2 : 1/2) by wt. Cost $1.50 per cu. yd. Langdon Pearse.

Irrigation with Sewage. C. C. Williams. *Eng. Record*, 65, 224.—The fallacy of sewage farming is exposed. In Pasadena the operating cost is twice the receipts. In Colorado, Greeley lets the sewage during the summer only. At Salt Lake City the sewage is leased for a nominal sum, compared to value of clear water. "In humid climates broad irrigation is uneconomical of land, and in arid regions it is wasteful of water." Langdon Pearse.

Is Powdered Raw Phosphate a Substitute for Thomas Phosphate? Thr. Remy. *Bonn. Landw. Jahrb.*, 40, 559–611.—Raw phosphate in form of Algerian phosphate cannot be compared with Thomas phosphate. Mixing the raw phosphate with decomposing material did not make the P_2O_5 much more available to plants. Treating the raw phosphate with $NaHSO_4$ and water gives a product which compares very favorably with Thomas phosphate and may be employed as a substitute for it. M. X. Sullivan.

How can the Use of Gypsum for Manuring be Promoted? E. Cramer. Berlin. *Chem. Ztg.*, 35, 223.—The use of gypsum on soil for its H_2SO_4 is often of limited value, but also frequently very favorable. KNO_3 and alkali fertilizers cause the soil to form crusts; gypsum will loosen up such soil. The fall-rotting (Herbstfäule) of beets is prevented by it. E. J. Witzemann.

Ammonium Sulfate in Agriculture. W. P. Bloxham. *J. Gas Lighting*, 117, 101.—It is suggested to supplement a farm-yard manure dressing of 10 tons per acre with 150 lbs. of $(NH_4)_2SO_4$ together with the necessary H_3PO_4 and potash to form an economic and effective dressing. C. A. Cole.

Report of Analyses of Commercial Fertilizers and Paris Green. J. E. Halligan. La. State Univ. Agr. Exp. Sta. *Fertilizer Rep.*, 1910–11; cf. *C. A.*, 5, 1487.—Analyses and valuations of 7,271 samples. Wm. P. Garrety.

Fertilizers, 1911. E. H. Jenkins and J. P. Street. Conn. Agr. Exp. Sta., *Ann. Rpt.*, 1911, Pt. 1.—A summary of the state law included. W. P. G.

Analyses of Samples of Fertilizers, 1911. E. L. Baker. N. Y. Agr. Exp. Sta., *Bull.* 341. Wm. P. Garrety.

The Fertilizer Inspection for 1911. B. E. Curry and T. O. Smith. N. H. Agr. Exp. Sta., *Bull.* 155. Wm. P. Garrety.

Commercial Fertilizers. Ky. Agr. Exp. Sta., *Bull.* 152. Wm. P. Garrety.

Relation of Calcareous Soils to Pineapple Chlorosis. P. L. Gile. Porto Rico Agr. Exp. Sta., *Bull.* 11.—Pot expts. and chem. analyses of soils indicate that pineapple

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chlorosis is due to excess of $CaCO_3$. This is harmful only in sandy soils, having but little effect in organic soils. Fertilizers were ineffective, but treatment of leaves and roots with Fe salts gave good results. This treatment is not commercially feasible. The disturbance of mineral nutrition, and not organic diseases appears to be the cause of chlorosis. Chlorotic leaves have low N content, and have less oxidizing enzymes than green leaves, probably because of lack of Fe. Chlorosis is increased by strong light, which destroys the chlorophyll. WM. P. GARRETY.

The Dipping of Sheep for Scabies in Tobacco Dips with and without the Addition of Flowers of Sulfur. E. S. GOOD AND T. R. BRYANT. Ky. Agr. Exp. Sta., *Bull.* 157. —Addition of flowers of S did not increase the value of the dip in this expt.
WM. P. GARRETY.

Action of Carbon Dioxide on Bordeaux Mixtures. C. T. GIMINGHAM. *J. Agr. Sci.*, 4, 69–75; *J. Soc. Chem. Ind.*, 30, 760.—Pickering (*C. A.*, 2, 963; 3, 1359) attributes the fungicidal action of Bordeaux mixts. to the action of CO_2 on basic Cu sulfate, producing sol. Cu. G. has found, however, that the whole of the Cu brought into soln. by the action of CO_2 for a short time is repptd. on removal of the CO_2. When the CO_2 acts for a long time the repptn. is not so easy, but these conditions are not those of actual practice, so that discussion must center round the action of small quantities. When a thin layer of the basic sulfate, 10 $CuO.SO_3$ (the compd. present in the Woburn Bordeaux paste) is exposed to moist CO_2, Cu is dissolved, but on exposing the product to air for two days all but the slightest trace is repptd. In the case of ordinary Bordeaux mixts. containing excess of lime, the action is the same, except that the lime must first be carbonated and therefore the solvent action of the CO_2 is delayed. It is therefore improbable that the fungicidal action is due to Cu sulfate liberated by atmospheric CO_2. J. J. M.

Sugar Beets from Peaty Soils (VILIKOVSKY). 28. Sewage Farms (ORTH). 14.

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16. FERMENTED AND DISTILLED LIQUORS.

ROBERT WAHL.

Rapid Acidimetry of Wine. F. REPITON. *Mon. sci.*, [5] 2, 93–4; cf. *C. A.*, 5, 3118.—In order to det. the total, carbonic, fixed, and volatil acids in a sample of wine only 3 operations are necessary: (1) The total acidity is detd. as described in *C. A.*, 6, 526. The soln. is titrated with 0.05 *N* NaOH and the reading in cc. times 0.49 gives the total acidity in 1 l. of wine figured as H_2SO_4. (2) The total acid less the CO_2 is detd. in another sample after b. by the same method. (3) The volatil and fixed acids are detd. in the same sample as (1) by the addition of a measured quantity of 0.1 *N* H_2SO_4 employing a method similar to (1). The diff. between detns. (1) and (2) gives the CO_2. The diff. between (3) and (1) gives the fixed acidity, the volatil acidity being obtained directly from detn. (3) by calc. C. A. NOWAK.

The Influence of Light on the Fermentation of Grape Must. W. LUBIMENKO AND A. FROLOFF-BAGREIEF. *Compt. rend.*, 154, 226–9.—It appears that light plays an important part in the fermentation of must. Strong light retards the multiplication of the yeast cells, but after a certain time the yeast cells capable of surviving produce a physiological species adapted to live and to ferment sugar soln. in strong light. In spite of this adaptation the fermentative energy of the yeast thus exposed to light is weaker than that of yeast not exposed, the difference increasing with rise in temp. The variable quantities of the divers products of fermentation produced

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under such conditions show that the light is not without influence upon the mechanism of fermentation. C. A. NOWAK.

Outline of Modern Wine Production. R. HAID. *Oesterr. Chem. Ztg.*, **15**, 15–20, 29–34.—A thorough discussion of important points, such as the ingredients of grape juice, mashing and pressing, control of fermentation, pure yeast, white wine, red wine, and claret production, chem. and physical changes in the grape juice during fermentation, tapping, ripening, adulteration, artificial clarification and pasteurization. ARTHUR LEDERER.

The Results Obtained in Fermentation and Assimilation Experiments with Yeasts. P. LINDER. Berlin. *Chem. Ztg.*, **34**, 1144.—Expts. have shown that of all sugars maltose alone is easily available as a nutrient sugar; glucose, fructose and cane sugar are much less satisfactory; in fact sucrose is often entirely useless. The behavior of most top-fermenting beer yeasts toward cane sugar is of technical importance. Since they do not grow at the expense of this sugar, the few cells remaining after filtrations cannot ferment it very much. Further the behavior of yeasts toward various types of N sources was studied: compds. with long hydrocarbon chains are easily assimilated; those with ring systems more difficultly, for example histidine. Leucine, lysine, adenine are easily assimilated but thymine, uracil, choline, hypoxanthine more difficultly. Adenine is more easily assimilated than hypoxanthine because the N is in the side chain. The more aerobic yeasts utilize the difficultly assimilable N more easily. Further expts. are under way to find a combination of N and C sources which will give good results of which the individuals are without nutrient value. E. J. WITZEMANN.

Researches on Diastase. T. CHRZAKZCZ. *Z. Spiritusind.*, **34**, 545; cf. *C. A.*, **5**, 755.—Expts. with purified diastase led to these conclusions, *viz.*: Diastase consists, fundamentally of 2 different substances, one of which liquefies and the other saccharifies starch. Since the fractions of the saccharifying portion of diastase differ so widely in their properties, the saccharifying enzyme is considered a complex substance. C. A. NOWAK.

The Utilization of Yeast. F. HAYDUCK. *Brewers' J. London*, **48**, 57–8.—In view of the successful results of feeding dried yeast to animals it was detd. that the present selling price of dried yeast is below its feeding value. The manuf. of dried yeast was undertaken on a large scale and the methods and app. employed are described. The introduction of dried yeast in domestic cookery is encouraged by a new and revized edition of the yeast cook book. C. A. NOWAK.

The α-Lupulinic Acid Content of Hungarian Hops. G. BIRO. Magyarovar. *Z. Nahr. Genussm.*, **22**, 607; cf. Feuerstein, *C. A.*, **5**, 2297.—Using the Satava-Remy method and evapg. the final petroleum ether soln. in small beakers, B. examined 33 samples of Hungarian hops and found 1.76–4.89, average 3.38% of α-lupulinic acid. A. F. SEEKER.

The Sources of Error in Malt Analysis According to the Congress Method. The Little-mash Method. W. WINDISCH. Berlin. *Chem. Ztg.*, **34**, 1143.—W. considers the allowed error of 0.8% in malt analysis agreed upon by the Gärungstechnischen Inst. as too large. This error is smaller when carried out on a very finely powdered flour sample. W. proposes the following method for detg. the malt ext.: The malt is ground to a fine meal, a 1–2 g. sample weighed out, mashed as usual, then transferred to a small filter, of which the dry wt. was detd., the spent malt washed thoroughly with hot water, dried and weighed. The ext. thus detd. is not identical with that detd. by the Congress method. In this method the sum of the compds. which become sol. on mashing and are removed on filtering and washing are detd.

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while the ext. value by the Congress method is the sum of compds. obtained by the hydrolysis of the malt constituents besides those obtained by ordinary soln. The former dets. starch as such while the latter dets. the amt. of starch in the form of sugar and dextrin. E. J. WITZEMANN.

Comparative Toxicity of Various Alcoholic Beverages. J. FRIENDEWALD. *Boston Med. Surg. J.*, July 13, 1911; *Pharm. J.*, 87, 300; through *J. Soc. Chem. Ind.*, 30, 1081. —Wine is more toxic than alc. or whisky, and red wines are more toxic than white wines. White wines are manufd. from the juice of the grape alone, while red wines are produced by the fermentation of the entire grape, including the skin and the seed, which contain the essential oils together with other toxic substances. The toxicity of alcoholic beverages is not proportionate to the alc. content, but rather to other substances which they contain. The liquor and rum are the most toxic of all drinks; beer and ale are about as toxic as whisky. E. J. C.

The Influence of Disinfectants on Worts. G. BODE. Berlin. *Chem. Ztg.*, 34, 1144.—In disinfection in breweries the app. used is often filled full of the disinfectant in which process it often comes in contact with residues of wort, beer, yeast, etc. In these proteins are present which are easily pptd. as colloids. In order to det. the effect of disinfectants on wort expts. were made using NH_4F, pyrazite, montanin, antiformin and HCHO. To 100 cc. of filtered and unfiltered wort were added 0.1, 0.5, 1, and 2 g. of the disinfectant. The first 3 disinfectants only caused slight turbidities and ppts., but at higher concs. strong turbidities or heavy ppts. were produced. Power to dissolve protein is assigned to antiformin, but at low concs. a ppt. was formed: only the larger concs. dissolved protein. HCHO ppts. strongly. The ppts. insulate the microörganisms against the bactericidal action of the disinfectant; crusts are formed on the walls which latter impede disinfection. The result is that the disinfecting soln. is used in stronger conc. which is objectionable on account of expense and the damage which it does to app. E. J. WITZEMANN.

Apparatus for Cooling Wort Prior to and during Fermentation. R. HEINZELMANN. *Wochschr. Brau.*, 29, 16–23, 27–30.—A comprehensive historical survey of the inventions in this line. C. A. N.

Determination of the Bitter Principle Content of Wort and Beer. DIETRICH WIEGEMANN. *Allgem. Brauer Hopfen Ztg.*, 51, 3172; *Wochschr. Brau.*, 29, 31–5.—The bitter principles present in beer or wort are entirely removed by shaking with benzine while the acid constituents are not affected. This method may, therefore, be used for the detn. of the bitter principles. The expts. show that during the cooling of the wort a part of the bitter principles is again thrown out of soln. A loss on b. in a reflux condenser amounting to about 10% of the total bitter principles points to the possibility of their reaction with other wort constituents forming compds. which are no longer sol. in benzine, have lost their bitter taste, and are not decomposed on b. with H_3PO_4. C. A. NOWAK.

Influence of Brewing Waters of High Sulfate Content on the Quality and Color of Beer. K. MAURER. *Z. ges. Brauw.*, 34, 589.—M. contests the common belief that water high in SO_3 content is unsuitable for brewing. A beer of excellent flavor and stability is being prepared from water containing 34.75 g. SO_3 per hl. This beer is much lighter in color than a beer prepared from water with 4.03 g. SO_3 per hl. Samples of a beer treated with Na_2SO_4 and NaCl, resp., and kept in a dark place 4–5 days were lighter in color than the untreated samples, the beer treated with Na_2SO_4 being the lightest. Water of high SO_3 content is, therefore, suitable for brewing pale beers. C. A. NOWAK.

Experiments with the Beer Filter. C. ANGERMANN. *Wochschr. Brau.*, 28, 604–7.

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—Filter losses based on practical experience are given. To minimize these it is recommended that the beer be left in the filter under pressure over night; this can be safely done. A. points out the disadvantages and advantages derived from beer filtration and favors some form of competing app., possibly the centrifugal separator. C. A. NOWAK.

Beer Carbonating and Filtering Process. H. ABBOT. *J. Inst. Brew.*, 17, 648–54. —The temp. at which beers are carbonated dets. the manner in which the gas is afterwards given off. Slow carbonation at 0° causes loose combination of the CO_2 with the constituents of the beer. By keeping a long time at low temp. and filtering bright, beers of good keeping quality are obtained but are lacking in palatefulness. By using higher temps. the palatefulness is retained but the beers are "gassy" and subject to sediment. It is of great importance that air should be eliminated from the vessels in carbonating beer as otherwise deficient head and flat flavor results. C. A. NOWAK.

Aluminium Fermenters and Storage Vats. C. BLEISCH. *Z. ges. Brauw.*, 35, 49–53.—The metal used for the expts. had the following comp.: Al 99.52%, Fe 0.261%, Si 0.21%, Zn and C trace, Cu faint trace. Neither soft nor hard water have any appreciable influence on this metal, nor was it affected detrimentally by fermenting wort. Of the disinfectants common in the brewery only HCHO is applicable to Al vessels. C. A. NOWAK.

Investigation of Aluminium with Reference to its Stability for the Construction of a Brewery Plant. A. C. CHAPMAN. *J. Inst. Brew.*, 17, 660–78.—The sensitiveness of com. Al depends on its purity, pure Al being least likely to corrode. Alkali chlorides, however, corrode even pure Al and it is, therefore, not suited for the construction of water cisterns. Al with less than 5% of impurities consisting of Si, Fe, Na, was not attacked by wort or beer. While in Cu vats the yeast on the sides of the vessels deteriorates due to Cu poisoning this is not the case in Al vessels, nor does Al produce metal turbidity. The sensitiveness of Al to alk. and acid cleansing agents is a drawback, but cleansing can be done satisfactorily by mechanical means and hot water. Al vessels in use in a brewery for 18 months have given complete satisfaction. The successful application of Al vessels depends on appropriate chem. comp., nature of its mechanical treatment and careful installation. C. A. NOWAK.

Alcohol Industry of the Philippine Islands. II. H. D. GIBBS. *Philipp. J. Sci.*, (*A*) 6, 147–206.—Continuation of *C. A.*, 5, 3493. J. J. M.

Determination of Methyl Alcohol (SIMMONDS). 7.

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17. PHARMACEUTICAL CHEMISTRY.

M. I. WILBERT.

Algerian Rue Oils. ROURE-BERTRAND FILS. *Wiss. ind. Ber. Roure-Bertrand fils*, 3, 22–3; through *Chem. Zentr.*, 1911, II, 139.—Ethereal oil from *Ruta montana*, commonly known as essence figeable, contains 90% methyl nonyl ketone, becomes solid 10°, sol. in 2.25 vols. of 70% EtOH and is slightly *d*-rotary, d_{15} 0.8307. Ethereal oil from *Ruta bracteosa* is liquid at —1°, becomes of the consistency of butter —5° but is still not solid —15°. D_{15} 0.8410, α —4° 12′. When dissolved in more than 2 vols. 70% EtOH, the soln. develops a slight blue fluorescence and commences to sep. paraffin. Ketone content amts. to about 90%. K. A. CLARK.

Diphenylmethane as an Artificial Perfume. J. DUPONT. *Am. Perfumer*, 6,

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167; through *J. Soc. Chem. Ind.*, 30, 1230.—Diphenylmethane (m. 27°, b. 261–2°) possesses to a high degree the characteristic odor of geranium leaves, and is well suited for use as a substitute for, or adjunct to, geranium oil in the manuf. of perfumes and scented soaps. E. J. C.

Solanaceous Drugs from India. ANON. *Bull. Imp. Inst.*, 9, 110–6; through *J. Soc. Chem. Ind.*, 30, 1085.—*Datura stramonium:* Specimens of the leaves, seeds, roots, fruit, and stems and one very small complete plant were examd. Hyoscyamine was the predominant alkaloid, being in most cases accompanied by scopolamine. No atropine could be detected but there was evidence of the presence of a 3rd alkaloid in the roots. Total alkaloid content: seeds, 0.186; fruits, 0.46; leaves, 0.41–0.45; stems, 0.24–0.26; roots, 0.214%. *Datura fastuosa:* Scopolamine was the predominant alkaloid in the twigs and leaves, and the sole alkaloid in the fruits and roots of this plant grown in Assam. The results with the Indian plants resembled those obtained with European plants. *Datura metel:* The Indian plant (seeds and leaves) contains considerable less alkaloid than the European plant 0.23–0.25 as compared with 0.50–0.55); in 1 sample scopolamine was the predominant alkaloid as in the European plant, but another sample contained more hyoscyamine than scopolamine. *Hyoscyamus reticulatus:* Seeds, 0.082; whole plant (1) 0.240, (2) 0.116% of total alkaloid. Hyoscyamine was the only alkaloid that was identified. Camels, sheep, and goats eat this species. *Hyoscyamus niger:* The results agreed with those obtained with the European plant. Leaves, 0.062; seeds, 0.081% of total alkaloid. E. J. C.

Japanese Vegetable Isinglass. ANON. *J. Roy. Soc. Arts*, 60, 415–6. E. J. C.

Characters and Tests of Paraldehyde. R. RICHTER. *Pharm. Ztg.*, 56, 536; *Pharm. J.*, 87, 201; through *J. Soc. Chem. Ind.*, 30, 1030.—The requirements of the new Ger. Pharm. in regard to paraldehyde, include sp. gr. 0.998–1.000; b. p. 123–125° and f. p. 6–7°; it is also described as containing about 4% of acetaldehyde, and the absence of excess of this is required to be shown by the non-production of a yellow or brown color within an hr. when paraldehyde, 6 cc., is shaken with 2 cc. of KOH soln. and 4 cc. of water. Careful exam. of pure materials shows that these requirements are not quite consistent. A mixt. of pure paraldehyde and acetaldehyde—the latter constituting 4% of the total—had sp. gr. 0.993 and f. p. 6.5°; but 54% of it distilled below 122.7° (cor.) and the remainder from 122.7 to 124.2°. Such a mixt., however, is not commercially obtainable, owing to the spontaneous formation of a little metaldehyde on keeping, which raises the f. p. The result of the test for aldehyde with KOH is greatly affected by temp. Since no temp. is specified for this test it must be assumed that it is to be carried out at ordinary room temp. (15–20°) but when a specimen of paraldehyde containing 4% of acetaldehyde was submitted to this test at 15°, the 1st faint tint was shown in 40 min., whereas when the same sample was tested at 20°, the 1st tint appeared in 20 min., and a yellow color after 40 min. When the test was carried out at 12–13° the sample just fulfilled the requirements. E. J. C.

Morphine Methyl Bromide—"Morphosan." K. SCHUSTER. *Z. allgem. Apoth. Verein*, 1911, 303; *Pharm. J.*, 33, 275; *J. Soc. Chem. Ind.*, 30, 1085.—The properties, reactions, and several methods for the prep. of morphine methyl bromide, $C_{17}H_{19}NO_3(CH_3)Br.H_2O$ (chemically identical with morphosan) are given. E. J. C.

Influence of Water Content on the Optical Activity of Camphor Solutions. E. VON KAZAY. *Pharm. Post*, 44, 495–6.—Exam. of solns. of 5 and 10 g. camphor in 50 cc. $CHCl_3$, C_6H_6, AcOH, paraldehyde, EtOH and MeOH resp. showed $[\alpha]_D = +43.6$. If H_2O be present α_D is lowered, varying from 8.3° with 4% to 7.1° with 37.3% H_2O for a 12.16% camphor soln. The d. of the latter being 0.894, the % of camphor would

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then be 9.53 instead of 12.16. H_2O exerts the same effect upon solns. of camphor in AcOH. This is due not merely to increased sp. gr. but, to a change in the rotatory power of the camphor. 5 g. camphor dissolved in 25 g. EtOH and 9.9 g. Et_2O gave the normal value of 8.3° in a 189.4 mm. tube, the sp. gr. of the soln. being 0.799. A considerable change of d. thus caused no disturbance in the rotation. If the H_2O content of a soln. be known the % of camphor present may be found by the equation: $\% = [(100/l[\alpha]_D)1/B]/d$ where $B = 0.1308$ for AcOH, and 0.12822 for EtOH solns., as detd. from curves expressing the influence of 5–40% of H_2O. V. K. CHESNUT.

A Note on the Poisonous Properties of Parthenocissus quinquefolia. L. E. WARREN. *Am. J. Pharm.*, 84, 51–3.—The presence of alkaloids, glucosides, saponins or tox-albumins has not been demonstrated in this plant, but $H_2C_2O_4$ occurs in the fruit and CaC_2O_4 in many parts of the plant and a fatal case of poisoning is reported.

H. C. FULLER.

Role of Oxidases in the Formation of Certain Constituents of Essential Oils. B. T. BROOKS. *J. Am. Chem. Soc.*, 34, 67–74.—Tests for an oxidase were made by indophenol reagent, phenolph. and pyrogallol on juice obtained from fresh plants. The best reactions were obtained from juices from inflorescences. Oxidases were present in the caraway, peppermint and valerian root. The liberation of valerian odor is due to lipase. Oils containing thujone and pulegone gave positive results. Negative results were obtained from exts. of cultivated roses and palma rosa oil.

T. E. LAYNG.

Reactions of Pyramidon. A. MOULIN. *Ann. chim. anal.*, 17, 13–4.—Referring to an article by Pevenasse (cf. *C. A.*, 5, 2899) M. calls attention to his work on this subject (*Bull. soc. chim.*, 29, 201) and states that the reaction indicated by P. (blue color with HNO_3) may be produced with $AgNO_3$ and $Hg(NO_3)_2$; it is not produced by pure HNO_3 but with HNO_3 containing nitrous vapors (cf. also *C. A.*, 4, 1893).

F. W. SMITHER.

Alkaloidal Reactions (Hydrastinine). C. REICHARD. *Pharm. Zentralhalle*, 52, 1253–60; cf. *C. A.*, 5, 2903.—A review of the behavior of hydrastinine-HCl with various reagents including H_2SO_4, HNO_3, Cu_2Cl_2, $HgCl_2$, As_2O_3, $K_2Cr_2O_7$ and other substances. Characteristic crystals were obtained by the evapn. of a soln. of hydrastinine-HCl in HNO_3. $K_3Fe(CN)_6$ and $K_4Fe(CN)_6$ also give characteristic reactions when triturated with hydrastinine in the presence of water. A fragment of $K_4Fe(CN)_6$ produces a brilliant reddish green ppt. characteristically dichroic particularly when magnified. The ppt. with $K_3Fe(CN)_6$ is pearly white and under the microscope the crystals have the appearance of micaceous plates with waxy yellow borders. Na nitroprusside gives a ppt. resembling that with $K_4Fe(CN)_6$ under the microscope; however, the form and color of the crystals are distinctive. A. VORISEK.

The Assay of Aconite. A. B. STEVENS. *Bull. Pharm.*, June, 1911; *Pharm. J.*, 87, 33–4.—S. defends the U. S. P. process, stating: (1) Aconite properly kept does not deteriorate. (2) When deterioration takes place through improper care, chem. assay will detect such deterioration. (3) When deterioration is due to heat, the wt. of the Et_2O treatment residue is increased. The basic properties decreased; hence deterioration is easily detected by volumetric assay (cf. Taylor, *C. A.*, 3, 2609). (4) The Squibb test is valuable for comparison but is not suitable for pharmacopeial standardization to be used by different individuals. (5) $CHCl_3$ should not be used in the assay of aconite. (6) The chem. assay is not scientifically exact, but is sufficiently accurate to be used in detg. the quality of aconite or its preps.

S. WALDBOTT.

The Composition of Aromatic Spirit of Ammonia. H. R. JENSEN. Liverpool.

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Pharm. J., 88, 4.—The recent method of J. C. Thomlinson (*C. A.*, 5, 1241) is not applicable where essential oils cause turbidity upon diln. J. substitutes a gasometric method. 5 cc. of the fluid are placed into a Hg-filled nitrometer and decomposed by 2 cc. of 30% H_2SO_4 while 600 mm. difference of Hg level is maintained. Only about 85% of the available vol. will be liberated at first. Most of the remainder is set free by removing that first obtained and reducing the pressure repeatedly, frequently shaking the soln. The EtOH menstruum tends to absorb some of the gas, for which loss correction should be made amtg. to 1.5 cc. for observed vol. The method is then accurate to 1%. S. WALDBOTT.

Note on a Spurious Reaction for Cellulose and Quinine Bark. WALTER J. DILLING. *Pharm. J.*, 88, 30.—Batka's reaction is claimed to be a test for cellulose or related substances, *e. g.*, starch, dextrin, gum, etc. These when heated in a dry test tube with any of the 4 common cinchona alkaloids (quinine, cinchonine, quinidine and cinchonidine) produce carmin-red fumes. Grahe's reaction is claimed to be a test for true quinine bark; when heating the bark in a dry test tube, similar fumes are evolved. D. shows that these fumes are obtainable from the pure alkaloids alone; hence Batka's test is of no value for the detection of cellulose, and in Grahe's test the presence of bark is not essential; a spurious bark mixed with a little of the alkaloid would give a similar result. S. WALDBOTT.

The Estimation of Mercury in Organic Compounds. W. A. PUCKNER AND W. S. HILPERT. *Rep. Lab., Am. Med. Assoc.*, 3, 24–6.—A proprietary prep. containing a protein combination of Hg was examd. It was claimed to contain 6.57% Hg. The organic matter was destroyed by a number of standard methods and the Hg weighed as HgS. The Neumann method yielded 4.27% Hg; the Schumm, 4.23%; and the Kjeldahl-Gunning, 4.23%. L. E. WARREN.

The Composition of Commercial Copper Citrate. W. A. PUCKNER AND L. E. WARREN. *Rep. Lab., Am. Med. Assoc.*, 3, 27–35.—Seven specimens from 4 firms were examd. for loss at 100°, SO_4, Cu, and for the radicals of citric and acetic acids. The Cu varied between 34.06 and 35.57%; the H_2O, 2.69–6.73%; SO_4, 0–2.48%; and citric acid radical ($C_6H_5O_7$), 46.58–56.45%. One specimen contained about 1% $Cu(OAc)_2$. Standards of purity are suggested. A requirement of 34–36% Cu is recommended. L. E. WARREN.

The Composition of Strychnine Arsenate. W. A. PUCKNER AND L. E. WARREN. *Rep. Lab., Am. Med. Assoc.*, 3, 35–42.—Four specimens from 4 firms were examd. for loss at 100°, alkaloid and H_3AsO_4. The comp. of the several specimens varied slightly but none were bad. Alkaloid was detd. by shaking out with $CHCl_3$. The H_3AsO_4 was detd. by weighing as $Mg_2As_2O_7$ and by reduction with SO_2 and subsequent titration with 0.1 *N* I. A comparison of the 2 methods for As was made on a known soln. of H_3AsO_4 but neither appeared to possess any special advantages over the other. A requirement of 68–70% of strychnine is suggested. L. E. W.

The Examination of Theophylline Preparations. W. A. PUCKNER. *Rep. Lab., Am. Med. Assoc.*, 3, 119–20.—Several proprietary preps. of theophylline were examd. for their content of H_2O and alkaloid. The theophylline was detd. by Kockun's method (*C. A.*, 2, 2846). Acet-theocin-sodium contained 6.25% H_2O and 60.76% of theophylline; acet-theophylline-sodium, 6.72% H_2O and 60.72% theophylline; and theocin, 4.43% H_2O and 96.25% theophylline. L. E. WARREN.

The Melting Point of Arbutin. W. A. PUCKNER. *Rep. Lab., Am. Med. Assoc.*, 3, 120.—A specimen of com. arbutin which it was claimed should m. 165–6° before drying, and at 144–6° afterward softened at 125° and was completely m. 135°. After drying it m. 143–4°. L. E. WARREN.

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The Preparation, Quality and Testing of Quinine Tannate. W. A. PUCKNER AND L. E. WARREN. *Rep. Lab., Am. Med. Assoc.*, 4, 45–60.—Quinine tannate is chiefly employed in medicin because it exhibits the alkaloid in a comparatively tasteless form. It is now official in many pharmacopeias, the alkaloidal requirement in none being less than 30%. The therapeutic efficiency and reliability of quinine tannate have been seriously questioned. The Council on Pharmacy and Chemistry of the Am. Med. Assoc. from the results of the experimental work concluded that quinine tannate containing over 30% of alkaloid may easily be prepared by any competent pharmacist but that the methods of prep. prescribed in the pharmacopeias yield products containing somewhat less than this quantity. To obtain products of even an approx. const. comp. it is necessary to employ definit proportions of tannic acid and of quinine. Four com. specimens were examd. Three of these were of good quality although 2 contained slightly less than 30% alkaloid. The remaining specimen contained about 9% of uncombined alkaloid, *i. e.*, about 26.5% of the total alkaloid present was in the uncombined state. A comprehensive bibliography is appended. L. E. WARREN.

Areca. W. A. PUCKNER. *Rep. Lab., Am. Med. Assoc.*, 4, 119–21.—Specimens of the powdered drug were assayed for total alkaloids by a method adapted from the Swiss pharmacopeia. The method is a crude one but is better than none. A market specimen assayed 0.44% alkaloid and gave 1.54% ash. A specimen of authentic origin assayed 0.52% alkaloids and gave 1.63% ash. A standard of 0.5% total alkaloids is suggested. L. E. WARREN.

Keratin. W. A. PUCKNER. *Rep. Lab., Am. Med. Assoc.*, 4, 121–3.—A provisional academic description for keratin was prepared and submitted to various manufacturers for criticism. Practically none was received. Exam. showed that the com. product was almost completely sol. (98.7%) in artificial gastric juice. It was, therefore, worthless for enteric pill coatings. L. E. WARREN.

The Assay of Chloral. L. BOURDET. *J. pharm. chim.*, 4, 18.—In the codex method a measured excess of standard alkali is added, the mixt. allowed to stand $^1/_2$ hr. and the excess of alkali titrated with standard acid and phenolph. B. shows that errors of 3–4% may creep in unless cold H_2O absolutely free from CO_2 be used. L. E. WARREN.

Process for the Extraction and Determination of Alkaloids in Sirup and Diverse Solutions Containing Sugar. E. KOHN-ABREST. *Bull. soc. chim.*, 11, 73–5.—Advantage is taken of the alk. and dehydrating properties of K_2CO_3, in aq.-alc. solns., to liberate alkaloids and alc. and to ppt. the bulk of the sugar that may be in soln. The following illustrates the method of procedure: A mixt. of 20 g. of sirup (d. 1.1500) containing 0.04 g. of morphine-HCl with 70 cc. of abs. alc. and 25 g. of K_2CO_3 is thoroughly shaken, in a stopped flask, and then allowed to stand over night. The supernatant alc. soln. of the alkaloid may be freed from the contaminating sugar by evapg. the previously filtered soln. to dryness, dissolving the alkaloid present in a small amt. of abs. alc., evapg. again and treating the residue with $CHCl_3$. From the resulting $CHCl_3$ soln. the hydrochloride or other salt of the alkaloid may be obtained in cryst. form and weighed. Codeine, quinine, strychnine and atropine may be detd. in the same way. M. I. W.

Artificial Violet Perfume. ANON. *Chem. Druggist*, 79, 596.—Several of the best known artificial orange and rose perfumes contain traces of the higher aldehydes of the acetic series. Monyl aldehyde and duodecyl aldehyde have come into use. According to the most recent reports from French perfumers the addition of 5–10% of the latter aldehyde to any of the compds. of the ionone type produces a bouquet infinitly superior to that of simple ionone. *Ibid.*, 922.—L. Givaudau in "The Perfumery Record,"

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stated that duodecyl aldehyde is of absolutely no use in violet perfumes but is decidedly useful in perfumes of the orange type. Its use in general is rather difficult and it must be employed in very moderate quantities only. M. I. W.

The Leaf Oil of the Washington Cedar (Thuja plicata). ROBERT E. ROSE AND CARL LIVINGSTON. *J. Am. Chem. Soc.*, 34, 201–2.—On steam distillation at 100°, the leaves and twigs of *Thuja plicata* were found to yield about 1% of clear light yellow oil having the following consts.: $D_{20°}$, 0.913; n_D^{20} 1.4552; $[\alpha]_D^{20}$ 4.77°; acid no., 0.518; ester no., 2.28; sapon. no., 2.8; acetylation no., 8.8. The oil is composed of 80–5% thujone, 3–5% pinene, 1–2% tanacetyl acetate, 1–3% tanacetyl alc. leaving about 10% to be accounted for by decomp. products and experimental loses. M. I. W.

An Allyloxanthrol and its Derivatives. H. KONDO. *J. Pharm. Soc. Japan*, 1912, No. 359.—(1) Benzanthrone, prepared by Bally from anthranol, glycerol and H_2SO_4, it was thought could be prepared by conversion of anthraquinone into allyloxanthrol and the conversion of this into benzanthrone. The attempt was futil but a number of derivs. of allyloxanthrol were made and studied. M. I. W.

An Examination of Various Species of Strychnos for the Alkaloids Strychnine and Brucine. A. F. SIEVERS. *Midl. Drug. Pharm. Rev.*, 45, 233–6.—Exam. of the seed and other portions of *Strychnos quaqua*, *S. tonga* and *S. spinosa* for strychnine and brucine indicates that the fruits of these species are edible and free from poisonous alkaloids. A table is appended showing the species of *Strychnos* which have been thus far reported on as to their content of strychnine and brucine. M. I. W.

An Unusual Oil of Wormwood. R. C. ROARK. *Midl. Drug. Pharm. Rev.*, 45, 237–8.—A sample of oil distilled some years since in Wisconsin had a very dark color, a minty odor, d_{25} 0.9168; sapon. nos. 150–151 (heated 40 min.), 182, 183 (heated 90 min.), 236.2 and 234.8 after acetylization. An appreciable quantity of salicylic acid was secured from the distillate of the saponified oil treated with H_2SO_4. From the unsaponified residue a quantity of thujone bisulfite was isolated; the oil remaining unaffected by treatment began to distil at 185°, the large portion distilling 195–200°. This fraction had a clear yellow color and a d. 0.9178. M. I. W.

Apomorphine Hydrochloride. A. SCHNEIDER. *Pharm. Zentralhalle*, 52, 537–8.—S. reviews the Ger. Pharm. V and other tests for the purity of apomorphine-HCl and outlines the following test for β-chloromorphide: 0.1 g. of apomorphine-HCl is dissolved in 10 cc. of water and this soln. overlaid by 20 cc. of ether and decomposed by 5 cc. of cold. satd. soln. of $NaHCO_3$ and then shaken until the resulting ppt. is dissolved. The aq. layer is then drawn off and the ether layer washed 3 times with 20 cc. of water and then evapd. in a test tube. The residue is treated with conc. H_2SO_4 containing 0.5% of $AgNO_3$; after standing 10 min. the mixt. is immersed for 1 hr. in b. water. The resulting clear brown soln. should be practically free from AgCl. M. I. W.

Reactions of Arecoline. *Pharm. Zentralhalle*, 52, 711–6.—A systematic review of the reactions of arecoline hydrobromide with various reagents. M. I. W.

New Oil Seed (GORTER). 27. Determination of Glycerol (WAGENDAR). 27. Normal Drop Counter (KUNZ-KRAUSE). 1. Materials Used in Embalming (LUCAS). 11A. Strychnos Alkaloids (LEUCHS, BREWSTER). 10. Determination of Benzoic Acid (REMY). 12. Derivatives of Natural Cedrene (SEMMLER, RISSE). 10. Spearmint Oil (NELSON). 12. Determination of Methyl Alcohol (SIMMONDS). 7. Antipepsin (DEZANI). 11A.

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18. ACIDS, ALKALIES, SALTS AND SUNDRIES.

T. LYNTON BRIGGS.

"Blue Acid." J. BURACZEWSKI AND S. ZBIJEWSKI. *Oesterr. Chem. Ztg.*, 14, 235–6; through *J. Soc. Chem. Ind.*, 30, 1208.—The blue soln. obtained by passing SO_2 into a soln. of nitrosylsulfuric acid in conc. H_2SO_4 (66° Bé.) is decolorized by prolonged treatment with the gas (2–3 days), giving a soln. which remains colorless when a current of pure dry CO_2 is passed through until the liquid ceases to smell of SO_2, but which rapidly acquires a blue color on subsequent exposure to air. The blue color is also slowly restored (after some days) by allowing the soln. to stand in a closed flask, in which case the odor of SO_2 also returns. The authors conclude that the blue acid is itself reduced by SO_2 (cf. Wentzki, *C. A.*, 4, 3122; 5, 2914, 3611), the product being immediately oxidized by exposure to the air and more slowly by H_2SO_4 which is reduced to SO_2. By starting with solid nitrosylsulfuric acid, the reduction product has been obtained as a solid. The reduction product is regarded as hyponitrosylous sulfuric acid. E. J. C.

The Ammonia Soda Process. W. HEMPEL AND H. TEDESCO. *Z. angew. Chem.*, 24, 2459–69.—The expts. were carried out on a lab. scale in an app. which could be kept within $^1/_2$° constantly at 30° under 1.8 atms. The NaCl was purified till it contained 0.01% $CaCl_2$, 0.009% $MgCl_2$ and only traces of Na_2SO_4. A soln. of NaCl containing 317.8 g. NaCl at 15° was used. The satn. of the NaCl soln. with NH_3 was detd. by titration. The satn. of the soln. with CO_2 was conducted at 30° under 1.9 atm.; at first the soln. had to be cooled and toward the end of the reaction heating was necessary. After 9 hrs. the ppt. was sepd. from the mother liquor by suction, and thrice washed with a soln. of $NaHCO_3$ satd. at 30°. The following detns. were made: in the initial soln. Cl, NH_3; in the mother liquor Cl, NH_3, CO_2, Na; in the ppt. Cl, NH_3, CO_2; in the wash soln. Cl, NH_3. The CO_2 detn. was made in an app., devized by the authors, depending on the displacement of water by the CO_2; 9–10 g. of the ppt. was used for the detn. With the increase in NH_3 conc. the content of NaCl in the mother liquor sinks and the NH_4Cl content rizes. With the introduction of CO_2 into the soln. (which has a large excess of NH_3) NH_4HCO_3 is formed and NH_4Cl is quickly pptd. If the conc. of NH_3 in the mother liquor is raised above 80%, NH_4HCO_3 is formed, and if a large yield of soda is desired the % of NH_3 must be carefully regulated. With an increase in NH_3 in the initial soln. the wash liquors dissolve out more Cl and NH_3. The % yield of $NaHCO_3$ increases until a certain excess of NH_3 is reached after which the yield diminishes. Slight excess of NH_3 gives most $NaHCO_3$. A soln. containing 4.473 mols. of NaCl and NH_3 per l. in equiv. amts. gives 71.19% $NaHCO_3$. With an increase in NH_3 excess a larger amt. of CO_2 must be used, which does not go to form $NaHCO_3$. If the NaCl is expensive, in factory practice, an excess of NH_3 is most economical; if cheap, only a slight excess of NH_3 should be used, saving at the same time CO_2. It is impossible to sep. all of the mother liquor from the ppt. by suction, but 3 washings give almost a pure product. By concentrating the initial soln. to satn. more NaCl goes into soln. and more $NaHCO_3$ seps. out. The use of dil. solns. is impractical owing to the large quantity of NaCl sepd. out. Temp. exerts an influence. At 40° 43.52 g. per l. less of $NaHCO_3$ was formed than at 30° and the temp. was too high for good CO_2 absorption. At 22° the ppt. was so fine that it could not be sepd. by suction and the yield of $NaHCO_3$ was 12.8 g. less per l. than at 30°. The solubility of NaCl in NH_3 solns. is given. E. C. LATHROP.

Removal of Ammonia by means of a Current of Air. Application to Analysis and to Industry. G. A. MERLO. *Ind. chim.*, 12, 17–20.—The NH_3 in solns. of NH_4 salts treated with NaOH can be detd. as accurately as by the usual distillation method

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by passing air through the soln. at the rate of 600–700 l. per hr. At room temp. the NH_3 from 20 cc. of a 5% NH_4Cl soln. was completely removed in 1.5 hrs.; at 40°, in 45 min. At the higher temp. equally good results are obtained when milk of lime is used instead of NaOH to liberate the NH_3. The addition of Al powder to the alk. soln. hastens the elimination of NH_3. The method was successfully applied to a no. of liquids (sewer water, ammoniacal liquors of gas works, etc.), to Kjeldahl detns. on blood, phosphates, Ca cyanamide, etc. (in the case of the last, results similar to Monnier's, *C. A.*, 5, 2793, were obtained). As to the industrial application of this method of removing NH_3, nothing definit can yet be said owing to certain technical difficulties. CHAS. A. ROUILLER.

Sicilian Sulfur Industry. ACHILLE AZZOLINO AND GIACOMO FIOCCHI. *Rass. min.*, 36, 61–4.—Extract from the report of the administrative council of the "Consorzio obligatorio" for 1906–'11. CHAS. A. ROUILLER.

Use of Dum Palm Nuts as Vegetable Ivory. ANON. *Bull. Imp. Inst.*, 9, 105–9; through *J. Soc. Chem. Ind.*, 30, 1078.—The nuts of *Hyphoene thebaica* (the dum or doum palm of the Sudan) are inferior to "ivory nuts" or "corosos nuts" (*Phytelephas macrocarpa*) for use in the manuf. of buttons on account of the large central cavity, which involves considerable waste in cutting, and the impossibility of polishing the material to a sufficiently high finish, but are used now because the price of corosos nuts has risen. E. J. C.

Research in the Small Factory. F. A. LIDBURY. *Met. Chem. Eng.*, 10, 140–1. E. J. C.

Certain Phases of Technical Chemical Research. Organization of Research of the du Pont Powder Co. A. M. COMEY. *Met. Chem. Eng.*, 10, 141–3. E. J. C.

The Research Laboratory Working Independently. Individual Research and Officialized Competition. P. MCN. BENNIE. *Met. Chem. Eng.*, 10, 143–4. E. J. C.

The Commercial Aspect of Research. Organization and Accounting of a Research Laboratory. C. F. LINDSAY. *Met. Chem. Eng.*, 10, 144–6. E. J. C.

The Importation of Chemicals and Related Products to the United States in the Year Ending June 30, 1911. *Chem. Ind.*, 35, 16. C. A. COLE.

Refrigeration and its Applications. E. LAMY. *Bull. soc. ind. Amiens*, 49, 118–37. —A lecture. E. J. C.

Ger., 231,270, Jan. 18, 1910. F. FRITZ. **Ferro-cerium igniter.** The friction surface of the igniter is perforated in order that the air may have free access to the engaging point of the surface.

Ger., 231,688, Jan. 19, 1909. AKTIEBOLAGET SVENSKA KONSTGÖDNINGSOCH SVAFVELSYREFABBRIKEMA. App. for **emptying charged superphosphate chambers** after the reaction.

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19. GLASS AND CERAMICS.

G. E. BARTON, A. V. BLEININGER.

Chemical and Physical Properties of Glasses. II. JAN SEBOR. *Chem. Listy*, 6, 53–6.—A study was made of the action of *N* KOH, 2 *N* KOH, *N* KOH in alc. soln., and 2 *N* HCl on a number of different kinds of glasses including Kavalier's (hard, common, and resistance), Jejkal, Jena, and Cologne-Ehrenfeld. NaOH was found

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to have greater action than KOH, and an alc. soln. of alkali was much less active than an aq. soln. Kavalier's glass seemed to withstand the action of the reagents better than the other varieties. Also, pure siliceous glass was found to be better than glass containing B. The coeffs. of linear and cubical expansion were detd. by direct measurement; they agreed well with results calc. from the coeffs. of the oxides. The sp. cond. was also detd. for different temps. up to 600°; it increases as the content of alkali in the glass increases. EDW. WOLESENSKY.

The Decomposition of Old Stained Glass and its Prevention. F. H. FAMMLER. *Glasind.*, 23, No. 3. J. B. PATCH.

Glass Roofs without Cement. ANON. *Diamant*, 34, 77–8 (7 illus.).—A detailed description of modern practice is given. Felt is used for packing at the joints. Gutters are provided for interior condensation. Square units of wire glass are recommended 76–80 cm. by 6–8 mm. J. B. PATCH.

Modern Gas Producers in the Glass Industry. K. QUASEBART. *Sprechsaal*, 45, 2–4, 18–22 (8 illus.). G. E. BARTON.

The Plasticity of Clay. ALBERT ATTERBURG. *Intern. Mitt. Bodenkunde*, 1, 4–37; through *Tonind. Ztg.*, 35, 1460.—The following points were taken as characteristic of a clay: (*a*) The "upper limit of flow," which is the comp. where a mixt. of clay and water is fluid; (*b*) the "lower limit of flow," where 2 drops of the mixt. in a dish cannot be made to unite by jarring the dish; (*c*) the "limit of stickiness," where the clay no longer sticks to the fingers; (*d*) the "limit of ductility," where the clay cannot be rolled into threads or rolls; and (*e*) the "limit of cohesion," where 2 moist lumps will not stick together. On detg. these for 75 clays and loams, it seems that *d* is the best qualitative indication of plasticity as commonly understood. This must lie below (*i. e.*, with less H_2O than) *b*. Loams may often be rolled out above *b*; this is called the "plasticity half-liquid substances," and is not true plasticity. Changes of temp. have a slight effect. Plasticity may be measured by the diff. in comp. at *b* and *d*, measured at 16–20°. The comp. at *c* is the normal comp. for ceramic technics. For most plastic clays it lies between *b* and *d*, dividing the plasticity into 2 kinds—sticky and non-sticky. If it lies below *d*, the clay is difficult to work, but may be improved by adding sand or very small amts. of organic substances. W. L. BADGER.

Veltener Clay Burned at Different Temperatures. H. SEGER AND E. CRAMER. *Tonind. Ztg.*, 35, 1497.—A characteristic of this clay is its very small shrinkage. The H_2O absorption increases up to cone 015*a*, where it is nearly as great as when unworked. From here it is nearly const. to cone 01*a*, after which it rapidly falls off. A deep red, very fat, brick clay showed the same behavior. This is ascribed to the finer particles sintering at first, increasing the pores; after a certain temp. is reached, the larger particles sinter and the whole mass shrinks. This is confirmed by the fact that more refractory clays decrease uniformly in H_2O absorption from the lower temps. on. W. L. BADGER.

Barium Sulfate, a Plastic Substance. A. ATTERBERG. *Z. angew. Chem.*, 24, 928–9.—Pptd. $BaSO_4$ if mixed with 14–22% of its wt. of water possesses plastic properties. On drying it lacks the cohesion of heavy clays. Minerals that split into scales or plates such as heavy spar, kaolinite, K mica, mica and talc are found to be strongly plastic if ground and elutriated so that the size of the particles does not exceed 0.002 mm. Granules of pptd. $BaSO_4$ examined microscopically were shown to be about 0.0002 mm. in diam. Materials like quartz, felspar and gypsum do not cleave in scales or plates and are hence not plastic. In the N. European clays the mica meal and in the S. European clays the fine kaolinite imparts plasticity. J. S. GOLDBAUM.

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Plasticity of Barium Sulfates. A. ATTERBERG. *Z. angew. Chem.*, 24, 2355.—Polemical reply to Ehrenberg (*C. A.*, 6, 797). J. S. GOLDBAUM.

Technical Study of Bohemian Clays. J. BURIAN. *Chem. Listy*, 6, 62–4.—An exam. of certain clays for the purpose of detg. their ceramic value, and including their chem. comp., behavior with acids, brick-forming qualities, and the effect of heating to different temps. EDW. WOLESENSKY.

Analysis of a Glass (RZEHAK). 8.

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20. CEMENT AND OTHER BUILDING MATERIALS.

C. N. WILEY.

Portland Cement. A. L. NOTENBASSERT. *Chimiste*, 2, 145.—Review. SIDNEY BORN.

Cold Weather Concrete Work. JOHN S. NICHOLL. *Cement Age*, 14, 81–4.—N. describes some of the methods employed to prevent concrete work from freezing before the cement sets. These methods are divided into 2 classes: (1) heating the materials or (2) adding chemicals to the gaging water whereby the f. p. of the resultant liquid is reduced. For the latter NaCl and $CaCl_2$ are generally used. Freezing permanently injures natural cement concrete but does not affect normal Portland cement concrete other than lengthening the setting time and reducing the early strength, but ultimately the strength is not affected. During freezing weather all concrete work should be protected by some insulating substance until the cement has set hard when the concrete will not be affected by even prolonged cold. C. N. WILEY.

The Relation of Copper, Zinc and Lead to Cement and Concrete in Contact Solution. E. HEYN. *Zement a. Beton*, 10, 402.—Tests were made at the Kgl. Materialprüfungsamt 1908–1910 to det. the corrosion of these metals embedded in concrete and immersed in dist. H_2O, tap H_2O, and solns. of $Ca(OH)_2$, $CaCO_3$, $CaSO_4$, sea H_2O and cement H_2O. The results showed that the presence of O is necessary for attack and by removal of the air the attack may be diminished or entirely prevented. The amt. of corrosion also depends on (1) the absorption of air from the soln., (2) the proportion of metal to concrete, (3) the rate at which new soln. and air from outside come in contact with the metal and (4) the permeability of the concrete. A. J. PHILLIPS.

New Tests on Reinforced Columns at University Wisconsin. M. O. WITHEY. *Eng. News*, 67, 383.—Résumé of lab. work in 1909–'11 on hooped columns, the conclusions being that a rich mix is more economical than a lean one, the best proportion of cement to aggregate lies between 0.2 and 0.7. The yield point is independent of the % of spiral reinforcing, the ultimate strength and toughness are directly affected, and all 3 are affected by the % of longitudinal steel. Only enough lateral reinforcement (1%) is necessary to prevent outward bulge of long. rods. Attention is called to the superiority of a few deformed bars of high C steel over plain round bars of mild steel. Such centrally loaded columns may be subjected to a static working stress equal to $^1/_2$ the stress at yield point. A. J. PHILLIPS.

Uses and Misuses of Concrete and Reinforced Concrete. DEWITT V. MOORE. *Cement Eng. News*, 24, 55–8. C. N. WILEY.

The Construction of a Cement Mill. ANON. *Cement Eng. News*, 24, 62–4; 9 illus.—Description of plant of the Lehigh Portland Cement Co. at Mason City, Iowa. C. N. WILEY.

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Dust in Portland Cement Plants. OTTO SCHOTT. *Cement Eng. News*, 24, 40–5; cf. *C. A.*, 6, 674.—S. describes the various methods which have been used to eliminate from cement factories the dust which not only causes considerable harm to the health of employees but also entails a loss of 2–5% of the ouput. Three methods are in use, all of which use exhaust fans for drawing off the dust from the machines or kilns: (*a*) Diminution of the velocity of the air, (*b*) filtration of the air through jute filters and (*c*) elimination by centrifugal force. The first 2 methods are used with more or less success in Germany and effect a saving of several thousand dollars yearly. Various installations are described in detail. C. N. WILEY.

Directions for Uniform Testing of Lime. ANON. *Z. öffent. Chem.*, 18, 12–8.—The official methods for testing air lime, weak hydraulic lime and strong hydraulic lime adopted Feb. 16–17, 1911, by the German Assn. of Lime Mfrs. Physical tests are given. PERCY H. WALKER.

Syrian Self-burning Limestone. ANON. *Oil, Paint and Drug. Rep.*, Aug. 7, 1911; through *J. Soc. Chem. Ind.*, 30, 1054.—A self-burning limestone occurs on the Hauran in a stratum between ordinary limestone; it is of a grayish black color, and when freshly broken has an odor of petroleum. The stone is now broken into small pieces and burnt in a clamp. After about 12 hrs. the stone inside has become converted into lime. Any pieces not thoroughly burned are burned over again. The lime is white and makes a very strong plaster. Great quantities of lime are made in this way. E. J. C.

The "Control Beam" in the Construction of the War Department Building at Vienna. J. KROMUS. *Beton u. Eisen*; through *Cement Age*, 14, 74–7.—K. discusses the great importance and assistance of the control beam, proposed by von Emperger in the construction of large concrete work. K. concludes from a series of tests made in freezing weather that freezing seriously affects the ultimate strength of concrete. All of the test pieces in which ice crystals were noticeable showed greatly reduced strength even up to 6 mos. This reduction of strength can apparently be avoided by protecting the concrete with an insulating covering such as straw, matting, etc. The control beam also shows whether the reinforcing is placed correctly. If the reinforcing is out of place a marked reduction of strength results. C. N. WILEY.

Waterproofing of Sewers. G. T. HAMMOND, *et al. Can. Eng.*, 22, 201–3.—The sewer construction of a no. of cities is given showing great variations in the amt. of ground water infiltration. Bituminous coatings or internal plastering with asphalt paints or maltha is recommended. To replace the cement mortar joint a 1–1 mix of sand and S heated to 110° is stated to be water-tight. For joints in yielding soils, bitumen or a paste of cement and pine tar has been successfully used.
A. J. PHILLIPS.

Influence of Locomotive Gases on Fresh Mortar. E. WILLMAN. *Beton u. Eisen*, 10, 436–7.—Tunnel air contains CO_2, CO and SO_2; the latter acting on lime mortar forms gypsum and prevents the hardening due to formation of $CaCO_3$. On cement mortar the completion of hardening due to the absorbtion of $Ca(OH)_2$ is prevented by reason of the formation of gypsum. The latter being sol. may be washed out leaving a weak aggregate of sand and stone (cf. *C. A.*, 6, 282, 284). A. J. PHILLIPS.

Magnesia Floors. ANON. *Oil, Paint and Drug Rep.*, Aug. 7, 1911; through *J. Soc. Chem. Ind.*, 30, 1060.—The use of MgO in the production of flooring is becoming extensive in Germany, and is known in the U. S. The flooring comp. consists of a soln. of $MgCl_2$ to which pulverized MgO is added. If to this cement sawdust be added in considerable proportions, the combination, when it becomes hard, possesses many of the qualities of both wood and stone. One Hamburg firm impregnates the wood

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meal with oil before mixing it with the MgO paste, and thereby renders it non-absorbent. Manufacturers of the artificial wood plates use cork waste as well as sawdust, and produce a variety of building materials, including floorings, wainscoting, and roofing plates. E. J. C.

Use of Treated-wood Paving Blocks. F. M. Bond. *Eng. Record*, 65, 223–4.—B. discusses the troubles experienced, such as expansion and swelling after being laid due to absorption of moisture, the greatest expansion being in a direction tangential to the annual rings. Neither light oil nor heavy oil waterproof the block sufficiently The summer wood of most pines and other coniferous woods absorb more oil than the spring wood and the sap more than the heart wood. B. recommends grouping the blocks so as to obtain uniform absorption in order to overcome expansion.
A. J. Phillips.

A Visual Method for Determining the Penetration of Inorganic Salts in Treated Wood. E. Bateman. U. S. Dept. Agr., Forest Service, *Circ.* 190.—Depth of penetration of Zn salts is detd. visually by the decolorizing action of the salts on U ferrocyanide. The method which is given in detail is capable of detecting as little as 0.17 lb. of salt per cu. ft. of wood. The method may be adapted to detn. of the amt. of penetration of other preservatives. Wm. P. Garrety.

The Prevention of Sap Stain in Lumber. H. F. Weiss and C. T. Barnum. U. S. Dept. Agr., Forest Service, *Circ.* 192.—Open stacking, by permitting free circulation of air, tends to prevent staining. Dipping with $NaHCO_3$ is a preventative. $HgCl_2$ gave best results, but is not recommended for general use because of its poisonous properties. Addition of CaO to Na_2CO_3 gave poorer results than Na_2CO_3 alone. Solns. of $MgCl_2$, $CaCl_2$, NaOH, phenol, $CaSO_4$, and $ZnCl_2$, and sprinkling with naphthalene flakes were ineffectual. Application of $NaHCO_3$ by machinery costs about 7 to 10 c. per M. board ft. Treated boards are very slightly less inflammable. With equal moisture content, sap-stained boards are slightly weaker than those free from stain.
Wm. P. Garrety.

Modification of the Sulfonation Test for Creosote. E. Bateman. U. S. Dept. Agr., Forest Service, *Circ.* 191.—The modified test, given in detail, is superior in speed, simplicity, and accuracy, and the conditions of the test have been made more specific.
Wm. P. Garrety.

Cutting and Seasoning Timber. A. Meyer. *Eng. Record*, 65, 76.—Railroad ties made of inferior woods such as maple and beech may be successfully treated for preservation if they are cut in winter, properly cared for, and seasoned for 6 mos. to 1 yr. D. F. McFarland.

Tannic Acid on Clay Roads. S. Pease. *Eng. Record*, 65, 207.—P. advocates the use of a soln. of 1 lb. tannic acid in 10–20 gals. water applied to a scarified clay road. Tests are to be made. Langdon Pearse.

Surface Treatment of Park Roads in Washington, D. C. S. Crosby. *Eng. Contracting*, 37, 124–5.—For the treatment of old macadam roads emulsions lasted only 2–3 weeks, depending on the rainfall (cf. *C. A.*, 5, 2320); sulfite liquor is higher priced than either oil or tar. Water-gas has given better results than coal-gas tar, as the latter loses its elasticity with time (*C. A.*, 6, 284). Asphaltic oil has given as good results and is cheaper. It is bought under the following specifications: Sp. gr. not less than 0.940 at 25°, at least 99% sol. in CS_2, and not over 0.2% insol. inorganic. It shall contain not less than 3% nor more than 10% bitumen insol. in 86° naphtha. When 240 cc. are heated in an Engler viscosimeter at 50° for at least 3 min. the first 50 cc. shall flow in not less than 10 nor more than 20 sec. The loss in wt. at 163° must not

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exceed 20%, the residue should be sticky and the fixed C shall not be less than 3.5% (*C. A.*, **3**, 2422, 2542). A. J. PHILLIPS.

Ger., 230,034, Dec. 7, 1909. M. KUTTNER and M. LUBECIUS. **Wood mosaic blocks** with a supporting layer of artificial stone. A layer of artificial stone is placed on the back of the bottom layer in order that this and the layer of wood cannot be influenced by moisture. This layer can consist of ashes, brick dust, minium, and linseed oil.

Ger., 231,575, Dec. 4, 1909. G. WASSERMANN. Production of **multi-colored mosaic plates.**

21. FUELS, GAS AND COKE.

J. D. PENNOCK.

Oskar Pintsch. EDIT. *Z. Beleuchtungsw.*, 18, 25.—Obituary. C. G. F.

The Carbonization of Coal. V. B. LEWES. *Gas World*, **55**, 665–9, 708–11, 738–43, 770–5; *J. Roy. Soc. Arts*, **60**, 136–45, 171–80, 188–97, 216–26; *Iron and Coal Trades Rev.*, **83**, 889, 929, 965, 1011; cf. *C. A.*, **6**, 543.—The pitch which causes coking is a residual product of the heating, not a primary constituent. Slow heating of coal at moderate temp. produces complex hydrocarbons which pass off with a minimum of secondary decomp.; rapid heating at high temp. results in decomp. of the hydrocarbons by passage over heated material and forms from them the pitchy binding material necessary for coking. Prolonged heating of the residue makes harder and stronger coke. Bright films of deposited C in coke come from decomp. of hydrocarbons by contact heat; decomp. by radiant heat which occurs with easily decomp. hydrocarbons like C_2H_2 deposits C in a duller and less dense form. Weathering of coal impairs its coking quality by action of O on resins, the O being presented in an active condition by preliminary physical absorption. The H_2O in coal is present both free and combined, the latter being expelled only at 103°. The compds. in coal are endothermic; their decomp. is exothermic, since the sum of the cal. values of the products is less than that of the coal. The complexity and uncertainty in the manner of decomp. of O compds. makes difficult the calc. of the cal. value of coal from its analysis and the detn. in that way of its degree of endothermicity. In the usual calc. all the O is assumed to be combined as H_2O, but in the products of decomp. very little H_2O is found and most of the O appears in the tar. The calc. value is therefore low, and cannot serve as a means of detg. the heat of decomp. Heat balances between coal and its decomp. products show 2–6% heat of decomp. according to % of volatil matter in the coal. The endothermicity of a coal becomes negligible when O is below 3%, and is approx. 250 cal. with 7–8% O. In distilling coal, the heat of decomp. is utilized in the evapns. and secondary reactions. Additional heat from outside (approx. 462 B. t. u. per lb.) is required to effect the distillation and decomp. processes. In gas retort practice, with regeneration and other economies, the fuel for effecting carbonization should not exceed 12–15% of the coal treated. Since coal and coke are bad conductors of heat, only a very thin layer next the wall is carbonized at the temp. of the retort, and the remainder of the coal is distilled at a slowly rizing temp. attaining its max. only when the volatil products are practically all driven off. Low temp. distillation (below 500°) gives chiefly satd. paraffin hydrocarbons, a large amt. of thin tar made up chiefly of paraffin compds. rather than aromatic, and very little free C, with a low NH_3 yield. In the distillation of coal for gas the final product is made up of (1) primary gases, (2) gas evolved from decomp. of pitch residues, and (3) secondary actions due to hot surfaces. Actions under (3) start about 400–450° and consist chiefly in decomp.

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of satd. into unsatd. and simpler satd. hydrocarbons, splitting off H from hexahydrides and decomp. of unsatd. into simple satd. hydrocarbons and free C. With a good Durham coal giving 11000 cu. ft. of gas per ton, 45% of the gas is from source (1), 42% from (2), and 13% from (3). New carbonizing methods have increased gas yields to 13000 cu. ft. per ton by effecting very thorough secondary decomp. of the primary products from the last $^1/_3$ of the charge carbonized. HORACE C. PORTER.

Coals of the State of Washington. E. E. SMITH. U. S. Geol. Survey, *Bull.* 474.—The coals of Washington vary from lignite to anthracite. S. describes the occurrence and character of the coal from the different mines and prospects and gives proximate and ultimate analyses and heat values for samples collected from nearly all of them. E. S. LARSEN.

The Systematic Purchase of Coal. F. R. HUTTON AND J. L. PULTZ. *Power*, 35, 285–7.—The authors discuss the combined bonus and penalty system used by the U. S. Govt. in the purchase of coal, and describe in detail the procedure employed by N. Y. City in the selection, purchase, and use of coal. The method of sampling coal for chem. analysis is described, also the application of the results of analysis to a detn. of price. L. W. RIGGS.

Use of Tar in the Diesel Engin. W. ALLNER. *J. Gasbel*, 54, 1025–30, 1051–9 (16 illus., 8 diagrams); cf. *C. A.*, 5, 1989, 2321, 3333.—The Diesel engin utilizes at present petroleum products, the lignite and shale products, and the tar products. So far, the tar from vertical ovens has proved the preferable tar because, owing to the less severe heat to which the tar and gas are subjected, this tar is less viscous, and contains less free C and naphthalene. The Deutsche Continental Gas-Gesellschaft found that tars from horizontal ovens and vertical ovens, resp., were running about as follows: Sp. gr., 1.16–1.25, 1.10–1.18; free C, 14.9–33, 0.2–4.3; flash point, 71–90, 40–71; viscosity at 60° (Engler), 16–51, 1.8–45. The present practice in using tar is to assist ignition by spurting about 5% of gas oil into the cylinder just ahead of the tar. Recently, however, it has been found possible to operate on tar oil and avoid the use of even this small amt. of gas oil, and very lately the Sulzer firm has succeeded in operating a 40 h. p. engin for 36 hrs. continuously on raw tar itself, using both vertical oven tar and certain kinds of retort oven tar, and wholly avoiding any use of ignition oil. The tar must contain the least possible amount of water, sediment and free C, and when using tar itself or tar oil as a fuel, neither Cu nor Zn or their compds. can be used for exposed surfaces, Ni steel being recommended particularly for those portions which are exposed constantly. The quantity of tar required is directly proportional to the heat value of the fuel, about 200 g. per brake h. p. hr. for a heat value of 16,000, and a single, vertical, Dessau retort gives tar enough for 12 hours' operation of a 20 h. p. Diesel engin. It is probable that tar and tar oil will find an especially favorable application in Diesel engins for torpedo boats and cruisers. C. A. COLE.

The English Gas Industry in 1910. *J. Gas Lighting*, 117, 69. C. A. COLE.

Application of Producer Gas in the Production of Electrical Energy with Recovery of Ammonia. M. WEIL. *Mon. sci.*, [5] 1, II, 467–72.—Description of a typical plant, and résumé of cost of producing elec. energy in this way. SIDNEY BORN.

Enriching Producer Gas. DOW R. WALKER. *Power*, 35, 296.—W. describes in detail an arrangement for adding gasoline to the air line of an engin, which enables the engin to carry a sudden increase over its designed load, or carry its usual load with a poor quality of producer gas. L. W. RIGGS.

Benzene Manufacture. OSKAR SIMMERSBACH. *J. Gasbel.*, 54, 581–2.—An

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article giving the extent and method of mfg. C_6H_6 from coke-oven gas at high temps. and its purification in the district of the upper mine office of Dortmund.

E. J. WITZEMANN.

Küpper's System Gas Producer. E. MANN. *Chem. Ztg.*, 35, 1447.—Referring to the article of Bauriedel (*C. A.*, 6, 542), M. asserts that the advantages claimed for the Küpper-Goliath producer are not realizable in practice and that the latter system is in no way superior to the Kerpely producer. G. N. TERZIEV.

Küpper's System Gas Producer. F. BAURIEDEL. *Chem. Ztg.*, 35, 1447.—Reply to Mann (cf. preceding abstr.). G. N. TERZIEV.

The Mathot Suction Producer. ANON. *Power*, 35, 295–6.—A description of this producer. The designer claims 7% more H and 25 more B. t. u. per cu. ft. of gas than in the ordinary type of producer. L. W. RIGGS.

Incandescence Mantles Made from Artificial Silk. NASS. *J. Gasbel.*, 54, 938–41; through *J. Soc. Chem. Ind.*, 30, 1201.—Photomicrographs show that in the use of mantles made from artificial silk the fibers remain distinct and unbroken, while the short fibers in mantles made from cotton or ramie become more or less untwisted from the original structure of the spun yarn. The mantles made from artificial silk are the strongest and most durable in use. When tested on Drehschmidt's machine, which subjects the mantle to a recorded number of shocks or vibrations, a good ramie mantle will endure 500 to 1000 shocks before fracture when new, but only 100 shocks after 10 hours' use. The mantles made from artificial silk endured 6000 shocks without fracture when new, and supported a suspended weight of 20 g., and after 500 hrs. use they supported a wt. of 15 g. An artificial silk mantle was used for 7 weeks on a high pressure burner, on which a ramie mantle lasted only 6 days. E. J. C.

Relation of Texture to Composition of Coal (GROUT). 8. Han-Yeh-Ping Iron and Coal Co. (CHO-YANG, WANG). 9. Apparatus for the Examination of Flue-gas. 1. Rustless Coatings for Iron and Steel (MEADE). 26.

Ger., 231,379, Mar. 31, 1910. SOLVAY & Co. App. for **separating tar from gases** of coke ovens or coal furnaces.

Ger., 231,824, Dec. 19, 1909. P. GROSSMANN. In an app. for **manufacturing gas**, a built-in tar-sepg. bell.

Ger., 231,975, June 15, 1910. INTERNATIONAL AMET CO. **Mfg. gas from oil.** Air and oil are fed into the generator chamber and the gas is produced by the heat developed by the combustion of a part of the oil, the inflow of the fuel being regulated by the difference of pressure prevailing on both sides of a resistance introduced into the air-conduit.

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22. PETROLEUM, ASPHALT, COAL TAR AND WOOD PRODUCTS.

R. E. HUMPHREYS.

Mexican Asphaltic Fuel Oil for Locomotives. A. R. GODFREY. *Eng. News*, 67, 102.—The oil ($1.75 (Mexican) per barrel) is used in its crude state as fuel. It is jet black in color, thick, and has a heavy asphalt base. Analyses of 2 cargoes show: d., 0.944–0.942; flash point (closed), 78–102° F., (open) 104–120° F.; fire test, 165–180° F.; viscosity at 100° F., 1,080–920 sec.; S, 3.44–3.35%; calorific value, 10,971–10,610 cal.; asphalt, 37%; coke, 12%. To burn this oil it must first be warmed by

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heaters in the engin tanks. Incomplete combustion is shown by the formation of a mass of C in the fire box. Adjustment of the height of the burners remedies this to some extent. D. F. McFARLAND.

Extinguishing Oil Fires by means of Frothy Liquids. *Chem. Trade Rev.*, June 10, 1911; *Eng. Mining. J.*, 92, 201; *J. Soc. Chem. Ind.*, 30, 1042; *Engineering*, 93, 52–3.—In a recent test, a mixture of one quart each of caustic soda and alum solns. yielded 15 quarts of a yellowish white foam (d. 0–14) which could be sucked up and distributed like water with a hose. When added to water or petroleum spirit the foam spread itself over the surface of the liquid and remained almost unchanged for 20 minutes. Petroleum spirit to a depth of 20 in. was placed in a basement, 30 sq. ft. in area, and fired; the fir was extinguished in 78 seconds with 18 galls. of the frothy mixture. A burning petroleum spirit tank was similarly extinguished in 13 seconds. The petroleum spirit was practically unaffected, burning as usual after the removal of the froth. E. J. C.

Waterproofing of Sewers (HAMMOND). 20. Surface Treatment of Roads (CROSBY). 20. Treated-wood Paving Blocks (BOND). 20. Tar in the Diesel Engin (ALLNER). 21. Syrian Self-burning Limestone. 20.

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24. EXPLOSIVES.

C. E. MUNROE.

Annual Report of Chief Inspector of Explosives of Cape of Good Hope Province for 1910. J. E. FOAKES. *J. Soc. Chem. Ind.*, 31, 46.—F. gives the amt. and value of the different kinds of explosives imported, the total amt. of explosives manufd., the amt. exported to Australia, and statistics of the results of governmental inspection and supervision. CHARLES E. MUNROE.

Interim Report of Chief Inspector of Explosives for Transvaal and Natal Provinces for Six Months ending December 31, 1910. A. B. DENNE. *J. Soc. Chem. Ind.*, 31, 46.—Gives statistics of manuf. and importations by classes of material and sources of supply for explosives and fuse. CHARLES E. MUNROE.

Report for 1910 of Mining Explosives Used in Mines and Quarries in Great Britain. *J. Soc. Chem. Ind.*, 30, 1411.—Detailed statistics of each explosive used. The quantity of permitted explosives used was 8,607,882 lbs. CHARLES E. MUNROE.

Determination of Glycerol (WAGENAAR). 27.

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25. DYES AND TEXTIL CHEMISTRY.

L. A. OLNEY.

Turkey Red. F. KORNFELD. *Chem. Ztg.*, 36, 29–30, 42–4, 58–9.—To det. the comp. of Turkey red, it is necessary to know the proportion of Al_2O_3 : CaO : alizarin. Analyses of dyed fabric are useless. It was necessary to det. the amt. of material taken from the bath. 100 kg. fiber took up 2220 g. alizarin = 9.25 g. mols. 100 kg. fiber took up 17,300 g. oil (olive or castor) = 55.5 g. mols. of pure fatty acid. Al_2O_3 = 9.28 g. mols. and CaO = 9.3 g. mols.; therefore fatty acid : Al_2O_3 : CaO : alizarin = 6 : 1 : 1 : 1. The formula is $(CHOH.C_{16}H_{31}.CO_2)_6Al_2Ca(C_{14}H_6O_4)$. SIDNEY BORN.

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Indigo Standards. K. N. MACDONALD. *J. Roy. Soc. Arts*, 60, 289–90.—Synthetic indigotin is not identical with indigo. Titration with $KMnO_4$ is no indication of the dyeing value of an indigo. The "dye test" is the only good test.
SIDNEY BORN.

Outline of a Color Analysis. P. DOSNE. *Mon. sci.*, [5] 1, II, 421-33; through *Chem. Zentr.*, 1911, II, 1174.—Based on Young-Helmholtz theory of color, a method is given by which the different nuances, as well as the intensity of each color, can be expressed by a symbol, as the 3 basic colors, according to Rosenstiehl, the 3rd blue, the 3rd yellow-green, and the orange of the Clevreul scale are taken. For their mixt. is used a turbin encased in a black lined cylinder, the axis of which carries a number of even metals plates, which can be so moved that an easily measurable sector of each is visible. Three of the plates are covered with paper, one of which is covered with one of the basic colors, another with paper covered with $BaSO_4$, and one with black velvet. The intensity of the basic colors are so arranged that a sector of 120° gives a neutral gray, which is identical with a mixt. of black and white in the turbin. For the qualitative detn. of a color it is only necessary to find the relation of the larger sector to the sum of both sectors, *i. e.*, to the 2 basic dyes, when rotation produces the same impression as the color to be detd. The 2 letters at the beginning of the name of each basic color properly expressed in % gives a symbolic representation of the nuance of a color.
SIDNEY BORN.

Proposed Scale for Measuring the Action of Light on Dyes According to "Bleach-hours." P. KRAIS. Tübingen. *Z. angew. Chem.*, 24, 1302–4.—There are numerous apps. for measuring color change but so far no uniform scale for measuring the action of light. Such a scale must be reliable, universally applicable, simple and must be constantly readjustable to all degrees of illumination. Test papers prepared as follows were suitable: 200 g. white kaolin (china clay) is mixed with 200 cc. H_2O and to this is added 400 cc. of a soln. of exactly 1 g. victoria blue R (A.-G. f. Anilinfab., Berlin) in 1000 cc. H_2O. After thorough stirring the clay is filtered off with suction. The color is dried at ordinary temp. in the dark and then pulverized; 50 g. are mixed with 35 cc. H_2O to which 45 cc. of a soln. of 50 g. gum arabic in 250 cc. H_2O is added. This is applied with a brush to wood-free unsized paper and dried in the air and is preserved in a dry, dark place. Tests with such paper showed: (1) Sunlight from hr. to hr. produces a graded fading which in May is approx. the same for each hr. from 10 A. M. to 4 P. M.; (2) the intervals of exposure from hr. to hr. can be clearly distinguished for the first 6 hrs, but not after that, because of the almost complete absence of color; (3) the fading in the open sunlight is a little greater than under 6 mm. of mirror glass. The difference only becomes marked when the sun strikes the glass at an angle—due to reflection; (4) the fading test papers do not change (or recover) on preservation in the dark; (5) in order to get a good measure of the fading the papers should not be exposed more than 5 hrs. The test papers are used as follows: Strips are exposed 1 hr. each during successive hrs. of bright sunlight; this test serves to check the equality of illumination during the time exposed; another series are exposed 1, 2, 3, 4 and 5 hrs. each at the same time. These are the standards for measuring the bleach hrs. Now when it is desired to test the fading of a dye, strips of this test paper are exposed simultaneously with the dye. The test papers are changed every day or twice a day on bright days and at the end of the test the total bleach-hours of exposure are measured by comparing the standards with each of the test papers run during the fading tests and adding all together. It is shown that the sun-hours (hours of exposure to sun) are not the same as bleach-hours. In one test the sample was exposed 54 sun-hours but the bleach-hours only amounted to 35.5 hours; another showed 24.5 sun-hours and 31 bleach-hours.
E. J. WITZEMANN.

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Criticism of P. Krais' Proposal. KURT GEBHARD. *Z. angew. Chem.*, 24, 1807–9; cf. preceding abstr.—G. has frequently stated that the rate at which 2 dyes are faded cannot be compared directly because of the large number of varying factors. It has been shown variously (color photography, etc.) that the comp. of sunlight varies at different times. Dyes may be classified according to their sensitiveness to light as follows: (*a*) Dyes which absorb the long waves (red, blue, green) and are therefore sensitive to these; (*b*) dyes which absorb mainly the short waves (blue, ultraviolet); (*c*) dyes which absorb long and short waves about equally well. Since only the rays absorbed are chemically active, dyes of the 3 classes cannot be compared with each other at all, especially when the comp. of the light varies as does that of the sun. Moreover, every dye has a certain max. light intensity which must be reached before the dye will be faded. If this intensity is not reached the dye remains unchanged. Likewise, the atmospheric conditions affect the fading—dampness, acid and alkali content of the air vary. The method is also objected to because: (1) Errors must arize in making so many color readings; (2) it is difficult to prepare the test papers absolutely alike, owing to variations in the materials used; (3) how long shall the test last? Some dyes fade rapidly at first and then cease to do so. Others behave differently. E. J. W.

Spectrophotometric Method of Detecting Dyes on Textil Fibers. A. PORAI-KOSCHITZ AND J. AUSCHKAP. *Rev. gén. mat. color*, 16, 1–11.—By a suitable arrangement of apertures and prisms rays reflected from a dyed fabric and a white fabric are passed into the spectroscope and compared as to intensity throughout the spectrum. The need of first dissolving the dye from the fiber is thus done away with. For details the original article, which is illustrated with drawings and photographs of the app. and with absorption tables and curves of various dyes, must be consulted.
M. R. MOFFATT.

The History of Dyeing Rose Shades on Cotton. P. MONTAVON. *Rev. gén. mat. color*, 16, 33–4.—Carthamic acid from the carthamus or safflower was used prior to the discovery of "aniline" colors. Dyeing recipes are given. M. R. MOFFATT.

Dark Stains Caused by Electrolytic Sodium Hypochlorite. J. DONNINELLI. *Rev. gén. mat. color*, 15, 341–2.—These stains appeared on cotton fancies (with vat-colored effect threads) which had been dyed an écru shade with a mixt. of direct yellow and brown. Previous to dyeing, the pieces had been degummed, boiled out under pressure with Solvay soda, chlored a little stronger than usual with electrolytic NaOCl, rinsed, soured, and rinsed again. The electrolytic NaOCl as purchased was 28° Bé. and contained 9% available Cl and 25% NaOH. The stains were shown to have been caused by the NaOH in the NaOCl being incompletely washed out. The NaOH left in the goods produced a partial mercerization in spots which then had increased affinity for dyes. The damaged material was recovered by passage through 5° Bé. NaOH which removed the spots, stripping with hydrosulfite, and redyeing. Future trouble was avoided by a more careful rinsing after bleaching. M. R. MOFFATT.

Imitation of a Figured Article on Linings. P. MONTAVON. *Rev. gén. mat. color*, 16, 34–6.—Referring to an article by Heilmann & Co., J. A. Liff, and M. Battegay (see *C. A.*, 5, 3913), M. points out that figured effects have for a long time been produced on linings by printing on plastic colors called "gouache," which were composed of a mixt. of white kaolin, Zn white, and casein, either with or without a coloring matter.
M. R. MOFFATT.

Artificial Silk in Decorative Art. ANON. *Rev. gén. mat. color*, 16, 36–7.—Illustrations of its use in screens and portiéres. M. R. MOFFATT.

Artificial Silk. M. RICHARD. *Z. Farbenind.*, 9, 361–4, 381–2; through *Chem. Zentr.*, 1911, I, 1901.—Review. SIDNEY BORN.

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Bleaching, Dyeing, Printing, and Finishing at the Roubaix International Exposition, 1911. E. DUHEM. *Rev. gén. mat. color*, 16, 11–9. M. R. MOFFATT.

Adulteration of Raw Silk. LEWITZKI. *Färber-Ztg.*, 22, 42; through *J. Soc. Chem. Ind.*, 30, 277.—The individual fibers of each of several skeins of silk showed widely varying strength, fineness and extensibility. It was found that in addition to 4% of weighting consisting of soap, fat and glycerol, the silk also contained Me orange. When the dye was destroyed by treatment with a soln. of hydrosulfite, some parts of the silk were stripped to a white, some to a pale yellow and some were unaffected. The silk had previously been reeled from all sorts of old cocoons and then tinted with Me orange to give it the appearance of a uniform product. E. J. C.

Increase in Volume of the Silk Fiber Caused by the Processes of Mordanting, Weighting and Dyeing. P. HEERMANN. *Färber-Ztg.*, 22, 29–33; through *J. Soc. Chem. Ind.*, 30, 126.—The vol. of the silk appreciably increases in mordanting, weighting, etc. There is no direct relation between this increase and the increase in wt. of the silk. H. gives details of the processes employed, which include: (1) The boiling off, and treatment of the raw silk; (2) simple mordanting processes; (3) treatment with catechu, sumac and gallnut exts.; (4) secondary and mixed processes, including the Prussian blue and logwood treatments, pyrolignite of Fe, Sn salt, Na phosphate and silicate, and also the dyeing process. The results obtained (industrial scale) give: (*a*), The original thickness of the boiled-off fiber; (*b*), thickness after treatment; (*c*), % increase in thickness and in vol. of the treated over the original fiber; and (*d*) in the case of certain mixed treatments, the % increase in vol. and thickness at different stages. E. J. C.

The New "Crude Silk Adulteration" of Lewitski. *Färber-Ztg.*, 22, 82–3; through *Chem. Zentr.*, 1911, I, 1464.—A dirty, fallow color is not an indication of inferior quality in crude silk. The yellow color objected to is due to a treatment with a lukewarm, weakly alk. bath of glycerol, vaselin, vaselin oil, borax, coconut oil or palm oil soap and yellow dyes, to facilitate spooling. Cf. preceding abstr. E. J. C.

The British Silk Industry: Its Development Since 1903. FRANK WARNER. *J. Roy. Soc. Arts*, 60, 393–415. E. J. C.

Reactions for Aniline (PESET). 10. Light and Dyes. Constitution and Dyeing (GEBHARD). 10. Vat Dyeing (GEBHARD). 10. Boron Ultramarines (HOFFMANN). 26. Ultramarines. 26.

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26. PIGMENTS, RESINS, VARNISHES AND INDIA RUBBER.

A. H. SABIN, D. SPENCE.

Different Colored Boron Ultramarines. J. HOFFMANN. *Chem. Ind.*, 34, 699–705.—B_2O_3 can replace SiO_2 and Al_2O_3 in ultramarine. All alkali borates, $R_2B_4O_7$, react with S, alkali sulfide, or ammoniacal polysulfide, giving yellow ultramarine. By removing some of the Na, green ultramarines are formed. Green ultramarine is intermediate between yellow and blue. Its constitution is $R_4B_{10}O_{17}$. Blue ultramarine is obtained from yellow or green by removing more Na. Its constitution varies between $R_2B_6O_{10}$ and $R_2B_{10}O_6$. Boron ultramarines can be considered as colloidal sulfide solns. in B_2O_3. Dissociated S in B_2O_3, P_2O_5, SO_3, H_2SO_4, KCN, shows ultramarine colors. S in boron ultramarines as well as silicate ultramarines can be replaced by Se and Te, whereby similar products are obtained. SIDNEY BORN.

The Manufacture of Ultramarine Blue. J. LUCIANI. *Rev. gén. mat. color*, 16, 18–9. M. R. MOFFATT.

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Synthetic Manufacture of Ultramarines. L. Royer and D. Lance. *Rev. gén. mat. color*, 16, 19–21. M. R. Moffatt.

Furnace for the Manufacture of Ultramarine Blue. D. Bourdet. *Rev. gén. mat. color*, 16, 38–40.—Descriptive, illustrated with drawings. M. R. Moffatt.

Does Paint Keep Iron from Rusting? Erik Liebreich and Fritz Spitzer. Berlin. *Z. Elektrochem.*, 18, 94–9.—Small Fe plates were highly polished and 1–4 coats of good paint applied. After thoroughly drying the plates were exposed for 96 hrs. in a mixt. of steam and air (cf. Bandow, *Chem. Ztg.*, 29, 989). Thereupon the paint was removed with toluene and the exposed surfaces photomicrographed. All paints consisting of pure linseed oil and either oxide of Pb, Zn, or Fe, or oxide of Pb or Zn with lampblack produced the same results, *viz.*: plates that had had one coat, no corrosion; 2 coats, partial corrosion; 4 coats, complete corrosion. Photographs are shown. Numerous other paints and paint mixts., including such as are specifically intended for structural Fe work, showed the same effects. A single exception was a paint containing a small amt. of alkali (D. R. P. 203,957 (*C. A.*, 3, 726)); no signs of rusting were visible no matter whether 1 or 4 coats had been applied. No well defined interpretation of the results is given. Further tests are in progress. The presence of impurities in the Fe appears to be unimportant. The theory of Walker and Lewis is not applicable (*C. A.*, 4, 254). The corrosion of the plates is probably due to the CO_2 and H_2O in the linseed oil. (Linseed oil free from CO_2 and H_2O was not tried). The sp. resistance of a dry Fe-oxide paint film, 0.01 mm. thick, was measured and found to be 5.10^6 ohms. C. G. Fink.

Rustless Coatings for Iron and Steel in Gas Works. Alwyne Meade. *J. Gas Lighting*, 117, 25–6 (illus.).—M. adopted the 2 following methods for protecting Fe and steel against the severe corrosion usually found in gas works. A thin coating of fine silver sand is sprayed onto the wet paint. The paint is allowed to dry and another coat is applied and sprayed with sand, and finally a 3rd coat, which is not sprayed. In all cases, the surfaces should first be thoroughly scraped and coated with a red lead paint without sand. This method has been found to materially prolong the life of the paint and tends to prevent peeling and blistering. It is particularly useful on mild steel plates and rolled steel beams. Cement sprayed in place of sand was not as satisfactory. Where steel was in close proximity to sulfate works, samples of dust near the app. usually showed some trace of acid, and under these conditions sand spraying failed, as did all the so-called acid-resisting paints which were tried. A coating of reinforced cement was then tried and proved satisfactory. In the case of a tie-bar, for example, the iron is first scraped and cleaned, then wound loosely with wire netting, $^1/_2$-inch mesh, and a wooden trough is suspended under it, which is filled with a stiff grout of neat cement. The cement neither cracked not chipped, and the treatment ha now been extended to steam pipes which should be cold when the cement is applied. C. A. Cole.

Acids of Rosin Oil. Ferdinand Schulz. *Chem. Listy*, 6, 59–62.—By fractional crystn. of the crude acids from alc. and glacial AcOH, a new acid, *oleosylvic acid*, is obtained; a white, cryst. solid, m. 171–3° to a colorless liquid. Under ordinary pressure, it distils at 330–5° (partial decomp.). Mol. wt. = 292, sp. gr. = 1.0736; $[\alpha]_D = +52°$. It is insol. in H_2O, sol. in CH_3OH, C_2H_5OH, C_6H_6, benzine, glacial $HC_2H_3O_2$, ethyl acetate, CCl_4, etc. The alc. soln. is perceptibly acid toward phenolph., alizarin, and litmus, and will decompose Na_2CO_3, but the Na salt is immediately decomp. by H_2CO_3. The elementary comp. of oleosylvic acid and the other fractions is practically the same, and identical with that of abietic and sylvic acids. The alk. salts are sol. in H_2O, while the alk. earth and heavy metal salts are pptd. in amorphous

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form. Ac_2O and conc. H_2SO_4 give the Liebermann-Morawski color reaction. Alk. permanganate is immediately decolorized by an aq. soln. of the Na salt. Br acts on the free acid by oxidation and substitution; addition does not take place. The free acid does not reduce Fehling's soln. or a Ag soln.; neither does it form an oxime or anilide. EDW. WOLFFENSTEIN.

Testing Varnish-makers' Benzine. KANTOROWICZ AND KEISERMANN. *Chem. Ztg.*, **55**, 1374.—The sp. gr. test is not sufficient, as varnish may contain an easily volatil proportion with the heavier ingredients, and this causes danger from fire. The correct test shows the rate of evapn. under known conditions; this rate should be const. The app. consists of a short wide tube with a jacket like a Liebig condenser, by which it may be heated, with steam or other vapor, to a known const. temp. A shallow porcelain boat containing the benzine is placed within this tube, the ends of which are then closed with perforated stoppers through which a known const. current of dry air is drawn. The heavier petroleum distillates have the higher solvent properties. A. H. SABIN.

Present State of the Industry of Plastic Organic Substances. W. K. MAIN AND A. CHAPLET. *Rev. gén. sci.*, **23**, 102–6. E. J. C.

27. FATS, FATTY OILS AND SOAPS.

E. SCHERUBEL.

Technical Crystallography of Stearin. ANON. *Ind. sap.*, **10**, 23; *Ausbürger Seif. Ztg.*, 1911, 1164; *Ind. chim.*, **12**, 26.—From a study of mixts. of palmitic and stearic acids of varying comp., Dubovitz has found that that containing 60% of the former and 40% of the latter crystallizes well and is very hard. As is well known, these are essential conditions for the successful removal of oleic acid by pression. Hence any given fat, otherwise not suitable for the stearin industry, may be made so by mixing it with another fat in such proportions that the mixt. shall contain palmitic and stearic acids in the above ratio. CHAS. A. ROUILLER.

Oleodistearin in the Fat of Mangifera indica Seeds. J. SACK. *Pharm. Weekblad*, **48**, 13; *Apoth. Ztg.*, **26**, 302; through *J. Soc. Chem. Ind.*, **30**, 634.—The kernels of the seeds contain 47.5% water, and 5.2% fat, m. 36°; acid no., 12.3; sapon. no., 175; I no., 54.5; R.-M. no., 0.2. The bulk of the fat consists of oleodistearin. By adding alc. to the ether soln. of the fat until turbidity occurs, this crystallizes out in fine needles; m. about 44°; readily sol. in ether, sparingly sol. in alc. E. J. C.

A New Oil Seed. K. GORTER. *Arch. Pharm.*, **249**, 481–2.—The seeds of a plant identified by J. J. Smith as *Shaphium lanceatum* yield an oil that congeals completely at 15° and does not melt fully below 48°. It has the following consts: Acid no. 12.2, sapon. no. 198.5, R.-M. no. 0, Hübl I no. 36.6, m. p. of free fatty acids 54°, congealing p. of free fatty acids 51.5, av. mol. wt. of free fatty acids 268. The oil is similar to Tenkawang fat (borneo tallow). M. I. W.

Determination of Glycerol. M. WAGENAAR. *Pharm. Weekblad*, **48**, 497–502; through *Chem. Zentr.*, 1911, II, 103.—The method is based on the formation of "copper glycerol" and is as follows: 50 cc. of the soln. containing glycerol are mixed with 25 cc. of 4 *N* NaOH and 25 cc. *N* $CuSO_4.5H_2O$ and set aside for 12 hrs. to let the $Cu(OH)_2$ formed settle; 25 cc. are pipetted out, 5 cc. 30% KI soln. and 10 cc. 4 *N* H_2SO_4 added and titrated with 0.1 *N* $Na_2S_2O_3.5H_2O$. By reference to a table one ascertains the amt. of glycerol corresponding to the cc. of $Na_2S_2O_3.5H_2O$ used. F. W. SMITHER.

Neat's-foot Oil (FAHRION). **29. Test for Benzoic and Salicylic Acids in Fats**

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(THOMANN). 11B. Abnormal Lard (VITOUX). 12. Diphenylmethane as a Perfume (DUPONT). 17.

Ger., 231,283, Feb. 19, 1910. H. STEGMEYER. App. for inserting soap cakes between the name stamps of a soap press.

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28. SUGAR, STARCH AND GUMS.

A. HUGH BRYAN.

The Determination of Sucrose in Cane Molasses by the Double Polarization Method, using Invertase and Acid as Hydrolysts. JAMES P. OGILVIE. *Intern. Sugar J.*, 14, 89–93.—With beet molasses, invertase gave results for sucrose higher than by the ordinary method of Clerget (*C. A.*, 5, 1686). This was laid to the effect of the alk. soln. Repeating the work on cane molasses, O. found: (1), That the sucrose values found by the generally employed method of using the alk. direct polarization are too high; (2), the sucrose value found by means of the neutral direct polarization may be likewise too high; (3), the sucrose values found by means of the acid direct polarization are in close agreement with those obtained by invertase. Hence, it is concluded that both the direct and the invert readings must be made under the same conditions of acidity to obtain the correct % of sucrose. A. H. BRYAN.

Determination of the Rendement of Raw Sugars by Washing. THEO. KOYDL. *Deut. Zuckerind.*, 36, 719–21.—Continuation of the polemic between Koydl and Claasen on the detn. of the crystal content of raw sugars. W. L. BADGER.

Chemistry and Sirup Making. W. E. CROSS. *Louisiana Planter*, 48, 142.—C. believes there is as much need of chem. control in a sirup-making house as in a sugar-making house. There should be heavier extraction of juice from the cane, for contrary to general belief, the purity of a juice does not suffer much. With an extraction of 56 the purity was 79 and with an extraction of 81 a purity between 77 and 78. He recommends the use of SO_2 to increase the acidity and then CaO added leaving an acidity of 1.5 to 2 cc. A. H. BRYAN.

Brief Observations on Molasses. A. VERMEHREN. *Deut. Zuckerind.*, 36, 679.—Ignited MgO ppts. caramel, and may be used for its detn. 1–1.5 g. MgO are sufficient for 5 g. molasses in dil. soln. After ordinary inversion, a gray-brown ppt. is sometimes found, almost completely sol. in alc. The insol. part is probably ulmin or ulminic acid, the sol. part melassic acid. W. L. BADGER.

Sugar Beets from Peaty Soils. VÁCLAV VILIKOVSKY. *Chem. Listy*, 6, 49–53.—Sugar beets grown on peaty soils are not only poorer is sugar than those on other soils, but they also yield a larger proportion of molasses. The latter fault is due to their unusually large content of the objectionable nitrogenous compds.; their ash contained abnormally large amts. of chlorides, sulfates, etc., which seem to interfere with the crystn. of the sugar, and therefore to increase the amt. of molasses. A direct relation exists between the amt. of N in the soil and the amt. of objectionable N in the beets. EDW. WOLESENSKY.

The Requirements of the Beet Sugar Factory as Compared with the Cane Sugar Establishment. ED. KOPPESHAAR. *Intern. Sugar J.*, 14, 82–8; cf. *C. A.*, 6, 167, 433.—This section deals with the liming of the raw juice, taking into consideration the burning of the limestone, the addition of the lime to the juice, the quantity needed and the carbonating. A. H. BRYAN.

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Comparison of Results Obtained by Maceration and by Diffusion in Agricultural Beet Distilleries. LOUIS AMMANN. *Compt. rend.*, 154, 294–5.—Detns. of sugars remaining in pulps extracted by both methods showed that maceration and diffusion are equally efficient in removing the sugars. The latter method is more rapid but requires more skill in operation and is only recommended when more than 50,000 kg. of beet roots are handled daily. P. B. DUNBAR.

Use of Aluminium Bisulfite in the Beet Sugar Industry as a Decolorizing and Deincrusting Agent. O. DURIEUX. *Sucr. Belg.*, 35, 535–6; through *J. Soc. Chem. Ind.*, 30, 1326.—Al bisulfite has been used in the past 3 campaigns at Givry, Belgium, with very satisfactory results. Filtered juice from the 2nd. carbonation nearly neutralized to phenolph., is treated in the evapg. supply tank with 300 cc. to every 10 hektoliters. Hydrolysis takes place immediately, the liberated SO_2 decolorizes the juice, and Ca aluminate is pptd. The scouring action of this ppt. keeps the evapn. tubes free from scale; and evapn. is easier because of the greater fluidity of the juice. On filtering the thick juice, the ppt. assists to collect the suspended organic matter, increasing the purity of the juice and thus giving a higher yield. W. L. BADGER.

The Products of Sugar House Operation. K. KAISER. *Deut. Zuckerind.*, 36, 737–41.—Discussion and comparison of data furnished by 10 factories on the amt. and comp. of their various products for the past 6 years. W. L. BADGER.

Experiments on Eradicating the Nematode Disease. KRÜGER. *Deut. Zuckerind.*, 36, 605–8.—Prelim. report and review of previous work. W. L. BADGER.

Determination of Gum in Sirup. A. C. CHAUVIN. *Ann. fals.*, 5, 27; cf. *C. A.*, 5, 3353.—Seven gums were analyzed and solns. of these with sugar in varying amts. prepared. Attempts were made to est. the gum by its pptn. with alcoholic neutral $Pb(OAc)_2$ soln. and also by pptn. with HCl and C_2H_5OH under varying conditions. By the 1st method the Pb ppt. was washed with HCl alc., dried, weighed, ignited with H_2SO_4 and HNO_3 to $PbSO_4$, weighed, and the loss of gum by ignition calc. In the 2nd method, the following procedure was used: 5 cc. gum soln., 5 cc. HCl, 5 cc. H_2O, 85 cc. 50% C_2H_5OH; filtered, washed, dried, weighed, and the % of ash and of moisture present naturally in the variety of gum under consideration added. The results on 10, 20 and 30% gum solns. with sugar were 2% of the added amt. and vary according to the nature of the gum employed. A. W. BROOMELL.

Effect of Feed Water Containing Sugar on Boilers (PILLHARDT). 14. Extraction and Determination of Alkaloids in Sirup (KOHN-ABREST). 17. Evolution of Heat by Microörganisms (SCHÖNE). 11C. Determination of Starches (GREITENHAGEN). 11B.

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29. LEATHER AND GLUE.

LLOYD BALDERSTON.

Gambier for Tanning and Dyeing. J. NOYER. *Rev. chim. ind.*, 22, 321–4.—N. gives analyses of refined and crude gambier showing marked superiority of the former. The higher price of pure gambier is more than offset by its increased advantages in tanning. N. describes experiences of the Deissler dyeing works at Crefeld, giving detailed comparisons. Crude gambier is $^3/_4$ as sol. in H_2O as the refined. Used with tin chloride and sodium phosphate 70 pts. pure are equivalent to 100 pts. crude. With Fe oxide 75 parts pure equal 100 pts. crude. No difference is observed in the final effects of the crude and refined. J. S. GOLDBAUM.

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The Minute Aspects of Gambier. JAMES SCOTT. *Leather World*, 4, 52–3.—S. gives a brief account of the method of prep. of gambier from the leaves and illustrates: (1) Magnified view of dissolving yellow (block) gambier, (2) modified crystals of gambier after dissolving as in 1, (3) burnt cube gambier in water, crystallizing into fairly large prisms. J. S. ROGERS.

Formation of Leather by Dehydration. L. MEUNIER AND A. SEYEWETZ. *Cuir*, 5, 111–5.—Knapp's process of dehydration by means of alc. makes a leather which goes back to the condition of hide as soon as it is wet. The authors use a satd. soln. of K_2CO_3 containing an excess of the salt. Wet hide placed in this soln. loses water and resembles the Knapp product except that in cold water it takes some time to return to the condition of hide. It may be washed in cold dil. acid to remove traces of K_2CO_3. The leather is fine-grained, pliable and very strong. L. B.

New Studies on the Tanning of Gelatin and Hide. L. MEUNIER AND A. SEYEWETZ. *Collegium*, 1911, 373–9.—In previous expts. the authors used Br water (see *C. A.*, 6, 815). Gaseous Cl decomposed gelatin without rendering it insol. Cl water alone, at 15–20°, causes swelling and hydrolysis due to HCl formed by the action of Cl on water. Addition of salt permitted Cl water at 0° to render gelatin and hide insol. Like results were obtained with NaOCl and chloride of lime. After thorough washing, the dried product retained 0.26–0.35% Cl. I gave negative results. A soln. of 6 kg. chloride of lime and 6 kg. NaCl in 300 l. water to 100 kg. sheep skins, with agitation for 1 hr. preserves the skins better than acid and salt pickle, and produces a fore-tannage which is an advantage in subsequent tannage by any process. L. B.

What Role do Acids Play in the Tanning Process? B. KOHNSTEIN. *Collegium*, 1911, 244–7.—It is generally considered that acids tend to "plump" hide and so promote absorption of tannin. That this may be the case, the plumped hide should be free from acid. Otherwise, material pptd. by the acid will coat the membranes, and tannage will proceed slowly. L. B.

The Employment of the Electrometric Method for the Estimation of the Acidity of Tan Liquors. II. J. T. WOOD, H. J. S. SAND AND D. J. LAW. *J. Soc. Chem. Ind.*, 30, 872–7; cf. *C. A.*, 5, 1722.—An improved form of Pt electrode is now used. The end point recommended is 0.69 volt, corresponding to the hydrion conc. of pure water. Results are given for various solns. of acids and salts, and for 30 tan liquors. L. B.

Preliminary Note on the Use of Nickel Hydroxide in Tannin Estimation. P. SINGH. *J. Soc. Chem. Ind.*, 30 936–7.—$Ni(OH)_2$ was used side by side with chromed hide powder for detannizing solns. made from 37 samples of Indian tanning materials. Preliminary tests on solns. of cane sugar, glucose, gallic acid, tannin and mixts., indicated that cane sugar and glucose are not pptd. by $Ni(OH)_2$, gallic acid 70% pptd., tannin, almost completely pptd. In the case of materials with high tannin content the tannin percentages given by $Ni(OH)_2$ in many instances agree closely with those given by hide powder. Variations are from 1.7% low to 1.7% high. To 100 cc. of the tanning liquor 100 cc. of a paste made of washed $Ni(OH)_2$ are added, and the mixture shaken. If the filtrate shows test for tannin, repeat, taking a larger amt. of the paste. L. B.

Voluminometer for Untanned Skin. J. T. WOOD AND D. J. LAW. *Collegium*, 1911, 230–2.—The vol. of a piece of wet hide is measured by the water displaced from a wide-mouthed glass-stoppered jar. A graduated tube is connected by a thick-walled rubber tube to an opening at the bottom of the jar, so that the vol. of the displaced water may be directly read. L. B.

Notes on Neat's-foot Oil. W. FAHRION. *Collegium*, 1911, 209–12.—The high price of neat's-foot oil makes adulteration with small percentages of cottonseed and other cheap vegetable oils profitable. Little has been done toward providing means

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of detecting these adulterations. F. gives the results of exam. of 11 samples of neat's-foot and 5 of bone oil, with comments. He recommends sepg. the solid and liquid fatty acids, detg. the I no. of each and the % of the former. L. B.

30. PATENTS.

Abstracts of patents are included under the foregoing divisions of the Journal. The abstracts of U. S. patents are prepared by Earl T. Ragan, those of the British, French and German patents by O. D. Swett and those of Canadian patents by Russell S. Smart, of Fetherstonhaugh & Co., Ottawa (5 Elgin St.). The abstracts of French patents are prepared, with permission, from the abstracts in *Chemiker-Zeitung*, those of German patents from *Chemiker-Zeitung* and *Chemisches Zentralblatt*.

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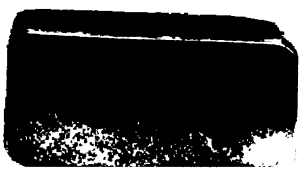

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